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STEEL

ESTABLISHED 1882

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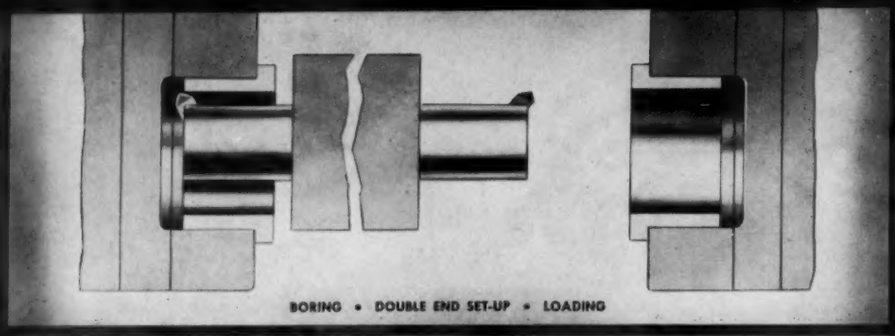
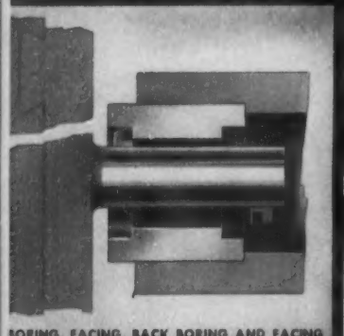


BORING • DOUBLE END SET-UP • LOADING

TAPER BORING



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DESIGNED FOR MANY JOBS!

Ex-Cell-O Standard Boring Machines Perform Numerous Operations . . . Simultaneously

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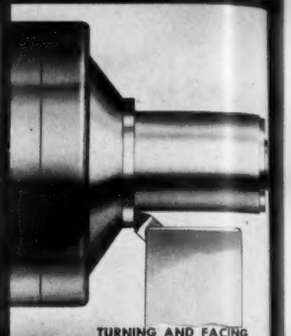
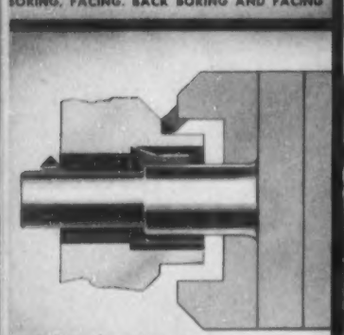


TURNING AND FACING



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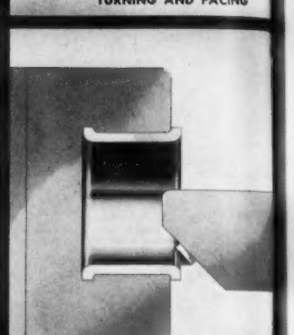

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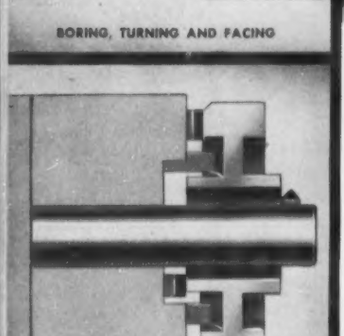
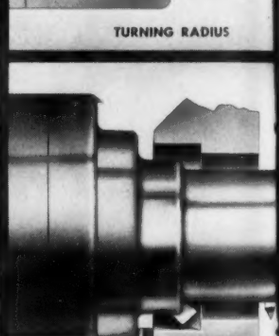
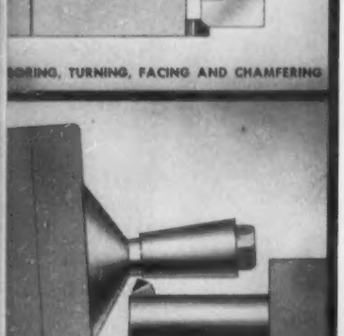


BORING, TURNING, FACING AND CHAMFERING



BORING AND FACING



TAPER TURNING

IN MACHINING interchangeable parts, there are varied possibilities to an Ex-Cell-O Precision Boring Machine. Not only will it rough and finish bore holes—straight, taper, blind, interrupted—but it will also turn, face, chamfer, groove, with almost any combination accomplished at the one time. Some of these single and combined operations are indicated by the surrounding sketches. And every Ex-Cell-O Boring Machine is a *Precision* Machine, with exclusive Ex-Cell-O features of design and construction that assure the greatest production of uniform work to the closest possible limits in size and finish. These Ex-Cell-O Precision Boring Machines (there are five standard styles) are enabling many manufacturers to meet successfully the unparalleled demand for defense items.

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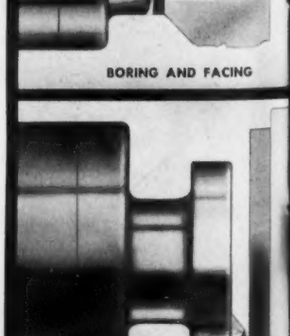
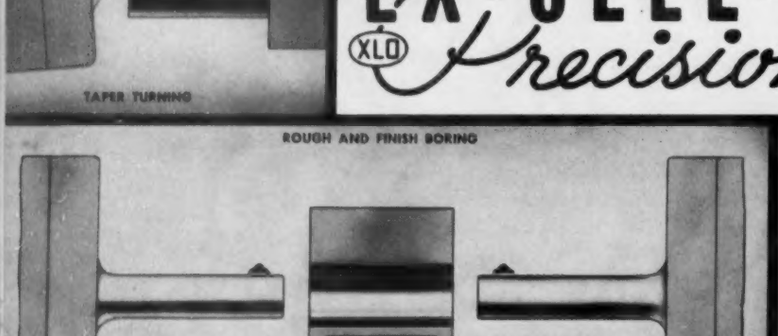
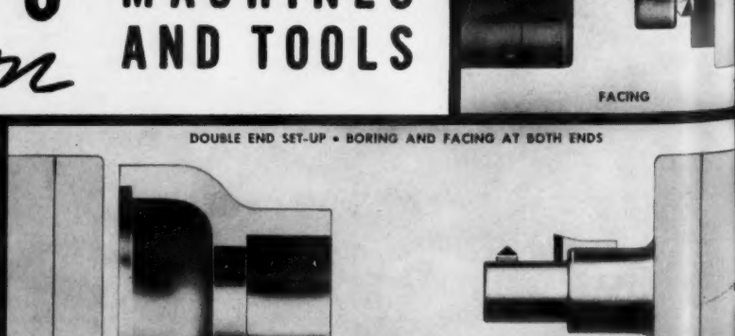
EX-CELL-O (XLO) *Precision* **MACHINES AND TOOLS**



FACING



ROUGH AND FINISH BORING



DOUBLE END SET-UP • BORING AND FACING AT BOTH ENDS

HIGHLIGHTING THIS ISSUE OF STEEL

■ NOW that it is becoming increasingly necessary for manufacturing plants to participate in defense production in order to obtain materials to keep men and machines at work, STEEL again **(p. 29)** tells how to go about getting such business. First step is to contact the nearest regional Defense Contract Service office **(p. 30)**, filing a statement describing skills and facilities available. Copies of such statements should also be filed with all primary contractors, the names of which, together with details of the kind of work involved, can be had from the same offices. It must be remembered that defense subcontracts are not given out unsolicited as a rule; real "selling" effort must be made to get them. Incidentally, OPM has a new division **(p. 31)** to stimulate subcontracting.

• • •

Many PD-73 Forms Filed

Consumers in large numbers **(p. 107)** already have filed filled-in PD-73 forms against orders on the books of the steel mills instead of waiting for Oct 15 deadline, thus assisting the mills in rescheduling business under the priority system. It will be generally helpful if those consumers who have not yet done so will take similar action without delay. One result foreseen from information that has developed under the new system is that quite a few consumers who have stocks considered as unnecessarily large will get less steel during September, thus enabling the mills to take better care of those who are pinched. Some comfort results from the fact that stocks have accumulated on considerable defense work.

• • •

Warehouses Get Priorities

The position of iron and steel warehouses is improved; under the priority system **(p. 39)** they are assured of replenishing stocks on a quota basis. . . . The new seven-man SPAB is seen by Bernard Baruch **(p. 32)** as a "faltering step forward." What is needed, he says, is a one-man defense head. . , Youngstown Sheet & Tube Co. **(p. 33)** will build a sintering plant with 60,000-ton monthly capacity. . . . Truck manufacturers have **(p. 41)** a blanket A-3 priority rating; the copper price ceiling has been revised. . . . The tungsten priority system **(p. 44)** has been expanded; cadmium is under a price ceiling. Eight more chemicals **(p. 40)** are under full priority. . . . Strategic highway construction **(p. 30)** is under priority.

• • •

Fire-Control Instruments

The first article in a series on rangefinders and fire-control instruments **(p. 62)** is presented by Professor Macconochie. . . . A recent innovation in fastening devices is the explosive rivet **(p. 81)**. It is especially useful in aircraft work. . . . A newly developed unit **(p. 84)** continuously welds tubing from low-carbon, stainless or other high-alloy steel skelp at speeds up to 150 feet per minute. . . . . G. Mauthe describes **(p. 88)** some unusual materials handling methods developed at General Electric's Bloomfield, N. J., plant. . . . Reliance Electric speeds motor assembly operations **(p. 96)** in its plant at Cleveland through use of special welded steel "blocks."

• • •

Heat Treatment Reports by OPM

To increase the use of the molybdenum high-speed steels by providing latest recommendations for their heat treatment, OPM sponsored three special committees of outstanding authorities in their respective fields. Their reports cover heat treatment of molybdenum high speed steels **(p. 60)**; the salt bath method for hardening these steels **(p. 73)**; and controlled atmosphere furnaces for their heat treatment **(p. 76)**. . . . While many developments have been made in new metal finishes, J. A. Meacham points out **(p. 94)** that the principles of protecting metal surfaces have not been changed. . . . A new hydraulic straightening press **(p. 99)** handles long bars.

Ryerson Night Loading Assures Quicker Deliveries

IT'S after hours, at any of the ten Ryerson steel plants, almost any night of the year!
The Ryerson night shift is putting the finishing touches on today's orders; loading out the fleet of big, red Ryerson trucks for tomorrow's deliveries.

The entire Ryerson organization is geared up to handle quickly the steel requirements, simple or involved, of thousands of customers the country over. Special telephone order desks, hourly mail pick-ups at the post office, telegraph and teletype lines into our offices—all help to speed delivery, even *before* the order reaches us.

Night loading to "clear the decks" for tomorrow's new crop of orders is the regular course of business. Every order is RUSH at Ryerson.

Ryerson Steel Service is as fast and sure as today's unusual circumstances will permit. Ryerson Certified Quality is your assurance of uniformity and exactness. Make the Ryerson Stock List your number one source for all steel requirements. If you haven't the latest Stock List we'll send one gladly.

Joseph T. Ryerson & Son, Inc.,
Chicago, Milwaukee, St. Louis,
Cincinnati, Detroit, Cleveland,
Buffalo, Boston, Philadelphia,
Jersey City.

RYERSON CERTIFIED STEELS

RYERSON

Small Plants Look to Defense Work as Priorities Curb Metals Supplies

Defense Contract Service branches in 36 cities ready to help obtain subcontracts . . . New OPM division to provide assistance . . . Government will aid in financing, obtaining skilled labor

■ METALS shortages, occasioned by extended priorities control and an accelerating arms program, soon will force upon nondefense manufacturers one of two alternatives: (1) Closing or sharply curtailing operations; or (2) changing to defense manufacturing.

While this warning has been sounded for the past several months, it had been only a threat. With full and effective priority control on steel and practically all other metals, it now has become an actuality.

Surveys by state labor departments in principal metalworking states show that a number of shops already have closed or laid off part of their employes as a direct result of material shortages. In many of these states the surveys show that half the civilian goods factories face suspension or restricted operations within the next few weeks.

A survey among the membership of the National Small Business Men's Association, extending into 42 states, disclosed that "unless defense orders or material for regular production can be obtained at once, more than 60 per cent of the manufacturing plants covered by the survey will be forced to shut down, throwing several hundred thousand men and women out of work."

Among manufacturers already affected are those making stoves, kitchen cabinets, hardware, fencing, agricultural implements, restaurant equipment, coin machines, automobile and refrigerator parts and similar articles.

Wherever steel, aluminum, copper, zinc, nickel, chrome are used, manufacturers without high ratings are feeling the priorities pinch.

Precision tool and instrument replacements also are a difficult problem. In most cases, micrometers, cutters, drills, reamers and chucks are impossible to obtain without priorities rating.

To Force Subcontracting

To meet this new "emergency" and to avoid as much "priorities depression" and unemployment as possible, the national defense agencies are moving to force a spread of defense work through civilian goods factories. Exhortations of the past will be replaced by compulsory subcontracting.

Principal points in the new program include:

(1) Requirement of a statement of the amount of work to be subcontracted from prime contractors. For contracts between $50,000 and $250,000 this need only be a statement of the percentage of work to be farmed out. When the amount involved is more than $250,000 a detailed statement on subcontracting intentions must be submitted with contract proposals.

(2) Special treatment designed to spread defense work wherever practical into communities or industries faced with dislocations because of inability to obtain materials. Negotiated contracts instead of those let by competitive bidding at prices up to 15 per cent above current quotations may be awarded if higher costs justify. Prime contractors may be reimbursed for additional costs resulting from the extension of subcontracting.

While the defense agencies will go as far as they can in spreading defense work through both prime and subcontractors, they urge civilian goods manufacturers to actively seek defense orders.

Manufacturers who want defense subcontracts are advised to get in touch with the nearest regional office of the Defense Contract Service and supply the office staff with a statement of equipment, personnel, supervision, and the type of work that can be executed.

It also is highly advisable for manufacturers desiring defense subcontracts to prepare statements de-

scribing their production facilities and the qualifications and training of their managements and their men.

Such statements should be duplicated in large numbers so that copies of them may be placed not only with the regional Defense Contract Service managers but with various prime contractors who may have work to farm out. Names of these primary contractors may be obtained from the regional Defense Contract Service representatives.

It has been pointed out by Defense Contract Service men in Washington recently that potential subcontractors should not stand by in their offices, waiting for defense business to be handed them. Rather, they are urged to do an active "selling" job in soliciting such business.

Prime contractors who wish to subcontract parts of their orders also are advised to consult with the regional Defense Contract Service offices.

A complete list of the 36 regional offices, the district co-ordinators and district managers, appears below. Most of these offices have been adequately staffed with competent engineers and consultants, familiar with the region they represent.

Manufacturers seeking defense work generally are discouraged from going to Washington. Usually it is a waste of time.

The government will aid in financing the conversion of civilian factories to defense factories and also will aid the manufacturer obtain necessary skilled labor.

Such aid has been granted in the past but soon will be increased. President Roosevelt enunciated the new policy last week when he said more money will be spent on old factories instead of new ones. The Chief Executive stated too much attention has been given the newer, larger factories and that there had not been enough effort to develop productivity of smaller shops.

The same policy was outlined by the new Supply Priorities and Allocations Board:

"Production will be stimulated and organized to the limit of the nation's resources. Every available man and machine must be employed on either direct defense requirements or at work essential to the civilian economy . . .

"We must forego the less essential that we may have an abundance of the more essential. By less essential industry is meant those industrial activities involving use of materials and production facilities which sap supplies and machinery resources necessary to a realistic all-out defense program . . .

"Wherever it is possible to convert the less essential to military or essential civilian production this will be done. Every means will be employed to expedite this process with a minimum loss of time for men and machines . . .

"To achieve this purpose, the board will devise promptly appropriate controls to assure equitable distribution of materials under a constructive system of priorities, the basic purpose of which is to assure the wisest use of all our resources for the task at hand.

"Those materials, which may be hoarded in the cellars and attics of certain industries and traders, will be routed out and put to use where most needed in military and essential civilian production. In its allocations, the board will consider existing supplies which have been bought in anticipation of future requirements."

Defense Contract Service Regional Offices

■ Thirty-six regional offices of the Defense Contract Service have been established in the 12 Federal Reserve Banks and the 24 branches of the Federal Reserve Banks.

Staffed with co-ordinators, managers and engineers, they are ready to help manufacturers obtain defense contracts and to find subcontractors for prime contractors. Offices are located in the Federal Reserve Bank buildings or can be reached through the banks. In the table below, cities in capital letters denote the Federal Reserve Banks; cities in small letters denote branch banks.

	District Co-ordinator	District Manager
BOSTON	Albert M. Creighton	Edward V. Hickey
NEW YORK	Robert C. Stevens	W. O. Crabtree
Buffalo, N. Y.	John J. Lenahan	
PHILADELPHIA	Thomas S. Gates	Frederick W. Hankins
CLEVELAND	George C. Brainard	Herman H. Lind
Cincinnati	Clifford Wright	Clifford Schulte
Pittsburgh	Alexander E. Walker	M. F. McOmber
RICHMOND, VA.	Jack G. Holtzclaw	Robert R. West
Baltimore, Md.	W. F. Roberts	G. W. Creighton
Charlotte, N. C.		Francis E. Field
ATLANTA, GA.	Frank H. Neely	W. C. Cram Jr.
Birmingham, Ala.	Edward L. Norton	Leslie E. Geohegan
Jacksonville, Fla.	George W. Simons Jr.	Charles C. McCubbin
Nashville, Tenn.	Arthur J. Dyer	W. G. Whitsitt
New Orleans, La.	A. B. Paterson	R. E. Judd
CHICAGO	Homer W. Hartz	Thomas S. McEwan
Detroit	Clarence W. Avery	Warren H. Clarke
ST. LOUIS	Harry B. Wallace	Frank J. McDevitt
Little Rock, Ark.	Charles L. Thompson	Alfred M. Lund
Louisville, Ky.	Charles W. Allen	Prentiss M. Terry
Memphis, Tenn.		Arthur M. Field
MINNEAPOLIS	R. B. Shepard	H. C. Timberlake
Helena, Mont.	J. E. O'Connell	R. E. Towle
KANSAS CITY, MO.	Kenneth A. Spencer	R. W. Webb
Denver		Clyde C. Haartzell
Oklahoma City, Okla.	Fred Jones	
Omaha, Nebr.		Arthur Walker
DALLAS, TEX.	Charles R. Moore	A. J. Langford
El Paso, Tex.		L. A. Wilke
Houston, Tex.	R. Lee Blaffer	I. M. Griffin
San Antonio, Tex.		P. E. Locke
SAN FRANCISCO	Raymond C. Force	W. M. Hale
Los Angeles		H. M. Craft
Portland, Oreg.		S. A. MacEachron
Salt Lake City, Utah		J. M. Leisner
Seattle	U. M. Dickey	F. C. Bold

Priorities for Highways

■ The OPM Priorities Division in a letter to Thomas H. MacDonald, public roads commissioner, last week outlined a broad plan to assist highway construction by facilitating the supplies and materials for a strategic highway net approved by the War Department in conformity with a master defense plan. Some other roads also will receive ratings.

Defense Newspaper

■ *"Defense Production News,"* has just been issued by the Allis-Chalmers Mfg. Co., Milwaukee. It will represent a monthly report stressing the importance of the company and its 1600 products in the defense picture. "It is expected that the 50,000 engineers and executives who receive it will better understand the attending difficulties in shipping nondefense equipment, retaining their high regard for the quality of Allis-Chalmers products," the company states.

New OPM Division To Aid Small Business Organized, Under F. B. Odlum

■ A NEW OPM division charged with the distribution of defense contracts among small plants was established last week by President Roosevelt. It will be directed by Floyd B. Odlum, president of Atlas Corp., New York investment company.

The White House said the new division was set up "in furtherance of a determined move on the part of the administration to help the smaller business units of the country obtain a fair share of the defense orders, and to prevent dislocation of industry and unemployment of workers in plants where production has been curtailed by priorities and material shortages."

The program has the complete support of the Army, Navy, Maritime Commission and OPM officials, it was said.

The new division will greatly expand the machinery already put in motion by the Defense Contract Service and the OPM labor division to subcontract defense orders.

"Through this division," the White House said, "the OPM will be enabled more effectively to adjust the dislocations and alleviate unemployment resulting from priorities and material shortages, and bring about maximum use of the nation's factories and industrial plants, especially the smaller ones." This will be done in four major steps:

Breaking down large orders into smaller units and spreading the purchases among more firms and in all localities possible.

Providing assistance through the labor division of OPM in retraining and obtaining re-employment for

Floyd B. Odlum

workers who are unemployed as result of shutting down of plants.

Effective distribution of defense contracts to the smaller business enterprises.

Providing a staff of industrial and production engineers to formulate and execute specific plans for the conversion of nondefense industries and plants to defense production.

The new division will establish field offices in various states to render assistance to manufacturers. Exhibits of various items needed for defense will be displayed and will be labeled as to quantities needed and the tools required for their production. Subcontracting arrangements will then be made on the "basis of what an individual sees he is capable of doing."

The division will provide through regular banking channels or the Reconstruction Finance Corp. the necessary financing for facilities for local industrial production associations, prime contractors and subcontractors.

Mr. Odlum was authorized to appoint two advisory committees, one comprising representatives of small business, the other industrial, management and production engineers.

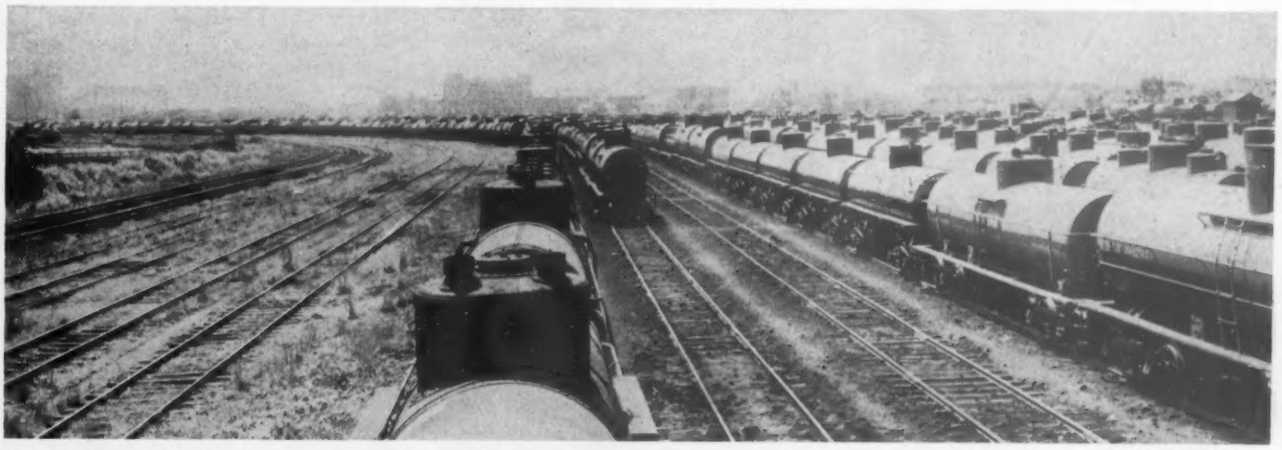
Commenting on the duties of the new division, Mr. Odlum said:

"'In a nutshell, its work will be to accelerate defense production to the maximum through spreading contracts among the smaller businesses. This will also help directly in utilizing idle labor and idle plant facilities. It will stimulate conversion of certain facilities to defense purposes that might otherwise become idle due to shortage of certain raw materials. . . .

"Higher cost producers have their place in the present all-out effort, just as the large factury uses its less efficient machines and a public utility system pulls on its old or standby equipment to tide over peak loads. The increased unit cost for a period is small compared with the alternate cost, delays and net results."

Directors of Atlas Corp. have granted Mr. Odlum a temporary leave of absence.

Pelley Submits Pictorial Proof of Many Idle Tank Cars



■ In support of his claim before the Senate oil investigating committee, Sept. 3, that "the railroads can knock the oil shortage into a cocked hat if the 20,000 idle tank cars are put to use," J. J. Pelley, president, American Association of Railroads, presented this picture of several hundred tank cars belonging to private tank car lines which are idle on sidings in private yards. Pelley told the committee that with these cars, "which could be started rolling in a week," the railroads could deliver from the Southwest to the eastern seaboard a minimum of 200,000 barrels of oil daily. NEA photo

Baruch, World War Production Chief, Urges Single-Head Defense Agency

WASHINGTON

■ "A FALTERING step forward." Thus tersely does Bernard M. Baruch, chief of industrial mobilization in World War I, characterize the latest reshuffle of defense agencies—the creation of the seven-member Supply Priorities and Allocations Board.

Mr. Baruch, who accomplished a remarkable job in getting war materials to flow from the production lines in 1917, doesn't think much of the present defense setup. Last week he stalked into the President's office and told him so.

What is needed, Mr. Baruch contends, is one-man defense control, a production chief with authority. America's mass producing strength cannot be mobilized effectively until it has a defense dictator, such as he was during the last war.

Mr. Baruch's opinions on the defense organization are shared by a large segment of American industry. Consensus is that while the various agencies are staffed with good and capable men no one with production experience holds sufficient authority to get out the goods. Skilled production men in OPM are hampered by red tape and by indecision and lack of candor at the source of all authority.

The chief of the old War Industries Board has evolved a one-man plan designed to speed up defense production. Details were not revealed to newsmen, however.

"Don't forget," he told newsmen, "that American industry and American workmen are the best in the world. All we've got to do is to get them going.

"Mechanical warfare is right down our alley. When we get going we'll break all records. We can chew up more stuff faster than anybody!

"But all problems can't go to that one man," he said, referring to the President.

Mr. Baruch reiterated his opposition to Leon Henderson's price control policy and announced he would tell the Senate banking and currency committee what he thinks about the proposed price control bill.

Wants Universal Ceiling

"I'm going to kick the everlasting life out of it," he declared.

"There should have been a universal ceiling on prices as soon as they began to talk about priorities."

The World War production chief also criticized the lack of effort to keep small plants going while "vast new plants" are being constructed. He conceded the government must build some huge new munitions plants but insisted it should not neglect established factories.

"We kept them going," he said.

Mr. Baruch's remarks preceded by a few hours the establishment of a new OPM division to distribute defense contracts among small companies. How the new division will fit into the defense picture had not been clarified at week's end but it appeared that it would duplicate to some extent the work now being done by Defense Contract Service (see page 31).

Bernard M. Baruch

◆

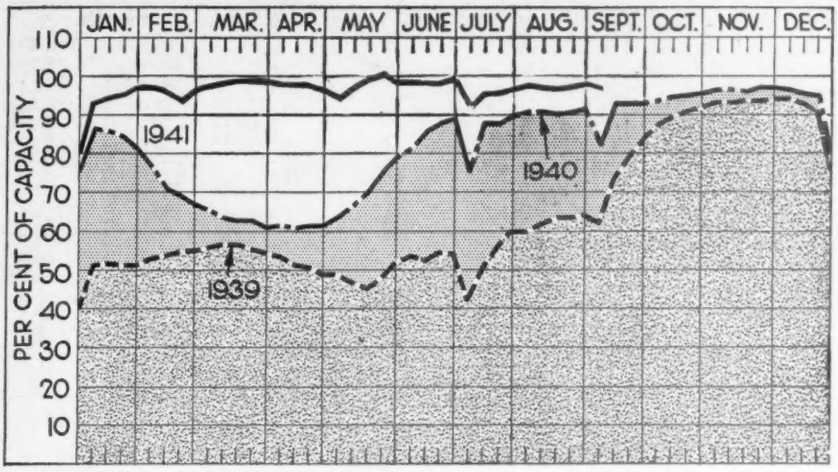
Young To Study Strike For Mediation Board

■ Owen D. Young has been appointed special representative of the National Defense Mediation Board to investigate the issues in the dispute between the United States Gypsum Co., Chicago, and the Gas, By-products, Coke and Chemical Workers (CIO). Dispute affects 3000 employes in 17 plants.

A two-month strike was ended last week at request of the board.

Issues which Mr. Young will investigate include general wage increases, vacation, arbitration of grievances and union security.

Photo at left shows Mr. Young conferring with William H. Davis, right, chairman of the mediation board.



District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Sept. 6	Change	Same week 1940	Same week 1939
Pittsburgh	98	— 2	72	55
Chicago	101	— 0.5	84.5	51
Eastern Pa.	95	— 0.5	79	46
Youngstown	96	— 2	75	57
Wheeling	94	+ 1	80	80
Cleveland	95	+ 2	81	68
Buffalo	90.5	— 2.5	90.5	60.5
Birmingham	95	None	88	70
New England	90	None	85	70
Cincinnati	89	+ 1	68	57
St. Louis	98	None	80	62
Detroit	86	— 6	94	99
Average	95.5	— 1	82	62

PRODUCTION . . . . Down

■ PRODUCTION of open-hearth, bessemer and electric furnace ingots last week declined 1 point to 95½ per cent, a result of some Labor Day idleness and repairs. Three districts gained, six were lower and three were unchanged. A year ago the rate was 82 per cent; two years ago it was 62 per cent.

Youngstown, O.—Due to suspension of open-hearth production Monday by Sharon Steel Corp. production was down 2 points to 96 per cent for the week. This week a rebound to 98 per cent is expected.

Buffalo — Declined 2½ points to 90½ per cent as Republic Steel Corp. took off an open hearth for repair; 39 of the district's 43 open hearths are in production.

Birmingham, Ala. — Unchanged at 95 per cent, with 23 open hearths in operation.

St. Louis — Held steady at 98 per cent, with schedule for this week at the same rate.

Chicago — Dropped ½-point to 101 per cent, steelmaking departments operating full through Labor Day.

Detroit — Lost 6 points to 86 per cent as Ford Motor Co. put out open hearths for Labor Day. Three furnaces are down for repairs.

Cleveland — Rose 2 points to 95 per cent as Republic Steel Corp. lighted another open hearth.

Central eastern seaboard—Slight changes resulted in loss of ½-point, to 95 per cent.

New England — With one open hearth down production continued at 90 per cent.

Pittsburgh — Necessity for furnace repair cut production 2 points last week, to 98 per cent.

Wheeling — Increased 1 point to 94 per cent.

Cincinnati — Slightly increased output by one interest raised the rate 1 point to 89 per cent, the same schedule applying for this week.

All Steel Requirements "Equal 95% of Capacity"

■ Estimated steel requirements during 1941 for defense, domestic civilian use, and export total approximately 80,000,000 net tons of steel ingots, or approximately 95 per cent of the industry's capacity as of Jan. 1, 1941, according to a report by the Committee on Commercial Research, American Iron and Steel Institute.

Its study is based on statistics of actual shipments of steel to major industries in recent years and during the first quarter of 1941, checked against analyses of expected demand from such sources in the remainder of 1941.

Total estimated requirements for 1941 exceed by approximately 20 per cent the tonnage of steel produced in 1940, the previous peak year for steel production, and are 60 per cent above 1917 output.

The following table shows the estimated steel consumption in 1941 of the major steel consuming classifications. The tonnages are expressed in terms of the ingots from which the products shipped to the consumer are rolled.

	Net Tons
Jobbers, dealers and distributors	11,800,000
Automobiles, trucks and mechanized military equipment excluding tanks	11,000,000
Construction industry, including highways, cantonments and defense plant construction but excluding ships and public utility construction	9,400,000
Exports	8,500,000
Railroad industry, including equipment builders	6,900,000
Steel converters and processors, excluding shell forging producers	6,200,000
Container industry	4,700,000
Manufacturers of pressed, formed and stamped steel including military items other than ordnance	4,600,000
Oil, public utilities and mining industries	3,400,000
Machinery and tools	2,800,000
Shipbuilding	2,600,000
Agricultural, including implement and equipment manufacturers	1,600,000
Electrical machinery and equipment	1,600,000
Aircraft	300,000
Miscellaneous	2,500,000
Military and ordnance items not included above (data supplied by Office of Production Management)	1,800,000
TOTAL	79,700,000

Sheet & Tube To Build New Sintering Plant

■ Youngstown Sheet & Tube Co., Youngstown, O., has authorized construction of a sintering plant with 60,000-ton monthly capacity, to be ready for operation next spring, company officials announced last week. Plant will treat wet ore and flue dust for company's blast furnaces.

Company also is planning to rebuild and enlarge its D blast furnace, increasing capacity from 700 to 1000 tons daily. The Jeannette stack at Brier Hill will be relined.

Steel for Sale In July
2.8 Per Cent Above June

■ Steel produced for sale in July totaled 5,226,102 net tons, 139,892 tons or 2.8 per cent more than the total of 5,086,210 tons in June, according to the American Iron and Steel Institute.

Exports in July were 430,493 tons, 103,136 tons more than the 327,357 tons exported in June, a gain of 31.5 per cent. Shipments to other members of the industry for further conversion totaled 307,492 tons, 44,496 tons, 14.5 per cent, less than in June.

July production was 1,152,263 tons greater than the 4,173,839 tons shipped in July, 1940, up 27.6 per cent. Details for the month are presented in the accompanying table.

Production in seven months this year aggregated 36,509,630 tons, compared with 24,896,782 tons in the corresponding period of 1940. Production for sale, less shipments to members of the industry for further conversion, related to estimated yield of 71.1 per cent of ingots, was 98.9 per cent of capacity in July and 102 per cent for seven months.

1940	Output	Exported	Pct. Exported
Sept.	4,446,555	951,555	21.4
Oct.	4,937,388	783,652	15.87
Nov.	4,760,948	562,587	11.82
Dec.	4,909,448	713,802	14.5
Year	48,584,860	7,683,858	15.8
1941			
Jan.	5,163,912	558,198	10.8
Feb.	4,864,936	560,035	11.5
March	5,411,319	491,519	9.07
April	5,269,748	331,942	6.29
May	5,444,235	317,442	5.8
June	5,086,210	327,357	6.4
July	5,226,102	430,493	8.2

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

July - 1941 (period)

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	Year to Date: Total	Year to Date: Per Cent of capacity	Year to Date: Shipments: Export	Year to Date: Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	35	1	xxxxxxx	548,925	xxx	169,275	153,493	3,487,232	xxx	850,424	1,094,346
	Heavy structural shapes	8	2	4,948,200	366,146	87.3	10,853	xxxxxxx	2,568,638	89.4	102,414	xxxxxxx
	Steel piling	4	3	422,000	27,328	76.4	3,770	xxxxxxx	204,583	83.5	17,956	xxxxxxx
	Plates—Sheared and Universal	19	4	6,294,590	483,238	90.6	17,545	896	3,198,840	87.5	216,633	14,194
	Skelp	8	5	xxxxxxx	31,169	xxx	10,435	34,133	611,115	xxx	102,312	250,927
	Rails—Standard (over 60 lbs.)	4	6	3,613,600	134,699	44.0	1,361	xxxxxxx	1,068,394	50.9	45,716	xxxxxxx
	Light (60 lbs. and under)	6	7	302,800	13,508	52.6	5,432	xxxxxxx	106,604	60.6	39,246	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	102,000	2,885	33.4	193	xxxxxxx	15,919	26.9	2,051	xxxxxxx
	Splice bar and tie plates	15	9	1,300,200	54,000	49.0	907	xxxxxxx	442,558	58.6	10,570	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	495,210	xxx	23,105	52,446	3,677,933	xxx	299,544	409,326
	Concrete reinforcing—New billet	16	11	xxxxxxx	127,578	xxx	11,544	xxxxxxx	844,408	xxx	122,853	xxxxxxx
	Rerolling	17	12	xxxxxxx	15,421	xxx	1,297	xxxxxxx	102,680	xxx	7,980	xxxxxxx
	Cold finished—Carbon	19	13	xxxxxxx	94,645	xxx	2,230	xxxxxxx	702,327	xxx	13,051	xxxxxxx
	Alloy—Hot rolled	16	14	xxxxxxx	142,110	xxx	9,400	8,895	975,829	xxx	83,171	84,677
	Cold finished	16	15	xxxxxxx	17,946	xxx	955	xxxxxxx	113,728	xxx	12,294	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	10,923	xxx	104	xxxxxxx	65,663	xxx	2,340	xxxxxxx
	TOTAL BARS	53	17	12,217,285	903,333	87.3	48,635	61,341	6,482,568	91.3	541,233	494,003
	Tool steel bars (rolled and forged)	16	18	128,920	11,424	104.5	635	xxxxxxx	67,093	89.6	4,556	xxxxxxx
	Pipe and tube—B. W.	13	19	2,049,200	136,631	78.8	8,931	xxxxxxx	901,604	75.7	71,460	xxxxxxx
	L. W.	8	20	385,260	44,036	59.7	2,554	xxxxxxx	285,056	55.4	19,124	xxxxxxx
	Electric weld	4	21	466,020	53,910	136.5	630	xxxxxxx	276,889	102.3	13,242	xxxxxxx
	Seamless	15	22	3,003,840	193,310	75.9	12,674	xxxxxxx	1,227,106	70.9	118,486	xxxxxxx
	Conduit	6	23	152,145	12,304	96.4	277	xxxxxxx	80,754	91.4	1,466	xxxxxxx
	Mechanical Tubing	12	24	516,725	38,773	88.5	3,391	xxxxxxx	272,407	90.7	25,283	xxxxxxx
	Wire rods	19	25	xxxxxxx	120,027	xxx	13,105	19,993	875,127	xxx	94,016	149,015
	Wire—Drawn	37	26	2,291,250	189,019	97.3	11,157	1,301	1,289,278	96.9	90,560	12,556
	Nails and staples	10	27	1,120,330	61,561	64.8	6,440	xxxxxxx	473,468	72.7	44,133	xxxxxxx
	Barbed and twisted	16	28	458,210	22,257	57.3	4,409	xxxxxxx	164,728	61.9	37,129	xxxxxxx
	Woven wire fence	15	29	746,180	24,516	38.8	139	xxxxxxx	193,277	44.6	1,251	xxxxxxx
	Bale ties	11	30	110,930	7,720	82.1	42	xxxxxxx	48,361	75.0	141	xxxxxxx
	All other wire products	5	31	24,280	509	24.7	-	xxxxxxx	5,757	26.6	-	xxxxxxx
	Fence posts	13	32	136,195	7,365	63.8	61	xxxxxxx	44,365	56.1	595	xxxxxxx
	Black plate	11	33	341,235	40,323	141.1	6,503		243,882	123.0	23,245	43
	Tin plate—Hot rolled	7	34	352,700	31,536	105.6	7,964	xxxxxxx	169,807	82.9	17,842	xxxxxxx
	Cold reduced	10	35	3,520,640	300,498	100.7	35,044	xxxxxxx	1,672,473	81.8	153,828	xxxxxxx
	Sheets—Hot rolled	24	36	xxxxxxx	583,402	xxx	25,015	17,124	4,398,972	xxx	185,221	129,543
	Galvanized	14	37	xxxxxxx	120,864	xxx	7,889	xxxxxxx	1,001,641	xxx	70,824	xxxxxxx
	Cold rolled	16	38	xxxxxxx	244,726	xxx	6,186	xxxxxxx	1,897,387	xxx	41,771	xxxxxxx
	All other	14	39	xxxxxxx	59,506	xxx	2,082	xxxxxxx	466,487	xxx	13,708	xxxxxxx
	TOTAL SHEETS	27	40	13,154,510	1,008,498	90.4	41,172	17,124	7,764,487	101.6	311,524	129,543
	Strip—Hot rolled	23	41	3,200,380	155,565	57.3	6,515	19,011	1,192,933	64.2	46,668	155,271
	Cold rolled	34	42	1,385,260	99,222	94.5	1,352	xxxxxxx	700,909	87.1	10,656	xxxxxxx
	Wheels (car, rolled steel)	5	43	422,825	19,547	54.5	138	xxxxxxx	146,625	58.7	437	xxxxxxx
	Axles	4	44	472,280	16,561	41.4	207	xxxxxxx	102,672	37.4	1,531	xxxxxxx
	Track spikes	11	45	327,275	13,053	47.1	357	xxxxxxx	103,129	54.2	2,025	xxxxxxx
	All other	4	46	24,100	1,451	71.0	-	xxxxxxx	12,852	91.8	79	xxxxxxx
	TOTAL STEEL PRODUCTS (a)	134	47	xxxxxxx	5,226,102	xxx	430,493	307,492	36,509,630	xxx	3,017,880	2,297,898
	Pig iron, ferro manganese and spiegel	24	48	xxxxxxx	665,037	xxx	35,706	207,802	4,458,108	xxx	316,463	1,352,794
	Ingot moulds	4	49	xxxxxxx	66,665	xxx	374	xxxxxxx	429,704	xxx	2,305	xxxxxxx
Iron Products	Bars	9	50	105,195	6,361	68.7	8	512	39,193	61.8	28	2,548
	Pipe and tubes	3	51	109,300	5,667	61.2	357	xxxxxxx	38,123	60.0	1,561	xxxxxxx
	All other	2	52	71,000	2,100	34.9	11	-	11,349	27.5	1,680	-
	TOTAL IRON PRODUCTS (ITEMS 50 to 52)	11	53	224,995	14,128	74.1	376	512	88,665	67.8	3,269	2,548

Total Number of Companies Included - 151

(a) Reported by Companies which in 1940 produced 96.5% of that year's total output of Finished Rolled Products.

The estimated average yield of products for sale from ingots produced by the companies included above is 71.1%, which applied to their total ingot capacity equals 58,680,500 net tons of finished rolled products. Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:

Current month 4,913,610 *N. T.;* 98.9 %
Year to date 34,211,732 *N. T.;* 102.0 %

Record August Pig Iron Production

Totals 4,784,639 Tons; Rate Is 98%

■ COKE pig iron production in United States in August totaled 4,784,639 net tons, highest monthly output on record, and 0.4 per cent more than the prior peak of 4,766,216 tons in July. Operating rate in the month increased 0.4 points to 98 per cent. Stacks in blast Aug. 31 totaled 213, a net gain of one from the previous month, according to reports from operators of the nation's 229 potential blast furnaces.

Total output in August, up 18,423 tons from July, was 13 per cent greater than 4,234,576 tons produced in the month last year. It represented an increase of 18.1 per cent from 4,050,989 tons, output in August, 1937, and highest monthly total for that year; and was up 14 per cent from 4,195,742 tons produced in the month in 1929. In the latter period 209 stacks were reported in blast.

Average daily production in the month, 154,343 tons, was also highest on record and was 594 tons greater than in July. It was 13 per cent greater than in August, 1940, and compared with daily average of 130,677 tons in the month in 1937 and 135,346 tons in August, 1929.

Total output in the first eight months this year, 36,614,527 tons, was 24.8 per cent greater than in the period last year, and was nearly double 19,642,202 tons, aggregate for the period in 1939. It compared with total production of 30,116,406 tons in the first eight months of 1937 and was up 12.1 per cent from 32,666,195 tons in the corresponding period in 1929.

Daily Average Up 25.3 Per Cent

Daily average production for the period January-August was 150,677 tons. This was 25.3 per cent greater than average of 120,262 tons in the eight months last year and compared with 80,832 tons, average for the period in 1939. In the first eight months of 1937, daily average was 123,936 tons, and 117,162 tons for the period in 1929.

Operating rate, 98 per cent, was up from 97.6 per cent in July, and compared with 96.3 per cent in June, 94.1 per cent in May, and 91.8 per cent in April, the lowest this year. In August, 1940, rate was 89.9 per cent, 62.4 per cent in the month in 1939, and 85.7 per cent in August, 1937.

Merchant iron produced in the month, 735,771 tons, was 15.4 per cent of the combined output and compared with 15 per cent in July and 14.9 per cent in June. In August last year, merchant production was 12.8 per cent of total output.

Number of stacks in blast at the end of August, 213, was the highest total for any month since July, 1929, when 217 were blowing. In July this year, 212 were active; 211 in June; 206 in May; and 191 in April, lowest this year. Total in blast in August last year was 190; 138 in the month in 1939; 191 in August, 1937; and 209 in the month in 1929.

One merchant stack was added in the month and none blown out. In the steelworks or nonmerchant classification, two furnaces were blown in and two were taken out. Stacks blown in during the month:

In Alabama: Ensley No. 2, Tennessee Coal, Iron & Railroad Co. One Woodward, Woodward Iron Co. In Pennsylvania: Duquesne No. 4, Carnegie-Illinois Steel Corp.

Stacks blown out: In Maryland: Maryland E, Bethlehem Steel Co. In Ohio: Ohio No. 2, Carnegie-Illinois Steel Corp.

Sixteen furnaces were out of blast Aug. 31. Ten, including several idle as much as 12 years, have been reported in process of rehabilitation, and some are scheduled to be lighted in the next few weeks. These include: Tuscaloosa and Rockwood 1 and 2, Tennessee Coal, Iron & Railroad Co.; One Detroit, National Steel Corp.; Granite City A and B, Koppers United Co.; Colonial, United States Pipe & Foundry Co.; Carrie No. 4, Carnegie-Illinois Steel Corp., expected to resume within the week; and the two blown out last month.

Following furnaces, many years idle, have not been definitely reported in active process of repair: Two Joliet and two Edgar Thomson stacks, Carnegie-Illinois Steel Corp.; Delaware, Philadelphia Electric Corp.; and Cumberland, Warner Iron Co.

Holt Stack Blown In

■ Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., blew in its Tuscaloosa furnace at Holt, Ala., Sept. 2. Stack was purchased from Central Iron Liquidating Co. in June (STEEL, June 9, p. 49) and has been completely rehabilitated. Built in 1903 it was last operated in 1929. It will be in charge of John R. Hunt, superintendent, formerly assistant superintendent of Ensley, Ala., blast furnaces.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1941[1]	1940[2]	1939[3]	1938[4]
Jan.	95.5	85.4	51.0	33.6
Feb.	95.3	75.0	53.5	33.6
March	96.3	69.5	56.1	34.2
April	91.8	68.9	49.8	33.4
May	94.1	74.2	40.2	29.4
June	96.3	83.6	51.4	25.5
July	97.6	86.1	55.0	28.2
Aug.	98.0	89.9	62.4	34.8
Sept.	....	91.5	69.7	40.5
Oct.	....	94.2	85.2	48.0
Nov.	....	96.4	90.3	55.0
Dec.	....	96.4	88.5	51.4

[1] Based on capacity of 57,503,030 net tons, Dec. 31, 1940; [2] capacity of 55,628,060 net tons, Dec. 31, 1939; [3] capacity of 56,222,790 net tons, Dec. 31, 1938; [4] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

MONTHLY IRON PRODUCTION
Net Tons

	1941	1940	1939
Jan.	4,666,233	4,024,556	2,436,474
Feb.	4,206,826	3,304,368	2,307,405
March	4,702,905	3,270,575	2,680,446
April	4,340,555	3,139,043	2,301,965
May	4,596,113	3,497,157	1,923,625
June	4,551,040	3,813,092	2,373,753
July	4,766,216	4,060,513	2,638,760
Aug.	4,784,639	4,234,576	2,979,774
Tot. 8 mo.	36,614,527	29,343,880	19,642,202
Sept.	.....	4,172,551	3,218,940
Oct.	.....	4,437,725	4,062,670
Nov.	.....	4,397,656	4,166,512
Dec.	.....	4,542,864	4,219,718
Total	.....	46,894,676	35,310,042

AUGUST IRON PRODUCTION
Net Tons

	No. in blast last day of Aug.	No. in blast last day of July	—Total Tonnages— Merchant	Non-merchant
Alabama	18	16	114,276	183,591
Illinois	19	19	112,682	365,037
Indiana	19	19	24,158	522,415*
New York	15	15	129,267	183,534
Ohio	47	48	156,207	950,313
Penna	72	71	166,557*	1,360,217*
Colorado	3	3		
Michigan	4	4		
Minnesota	2	2	13,183*	194,482
Tennessee	1	1		
Utah	1	1		
Kentucky	2	2		
Maryland	5	6		
Mass.	1	1	19,441*	289,279
Virginia	1	1		
West Va.	3	3		
Total	213	212	735,771*	4,048,868*

*Includes ferromanganese and spiegeleisen.

AVERAGE DAILY PRODUCTION
Net Tons

	1941	1940	1939	1938
Jan.	150,524	129,825	78,596	52,201
Feb.	150,244	113,943	82,407	52,254
March	151,707	105,502	86,465	53,117
April	144,685	104,635	76,732	51,819
May	148,262	112,811	62,052	45,556
June	151,701	127,103	79,125	39,601
July	153,749	130,984	85,121	43,827
Aug.	154,343	136,599	96,122	54,031
Sept.	.....	139,085	107,298	62,835
Oct.	.....	143,152	131,053	74,697
Nov.	.....	146,589	138,883	85,369
Dec.	.....	146,544	136,119	79,943
Ave.	150,677	128,128	96,740	57,962

MEN of INDUSTRY

■ **WILLIAM A. ROGERS,** co-founder of the pig iron firm of Rogers, Brown & Co., Buffalo, which firm still survives as Rogers Brown-Lavino Co., will celebrate his ninetieth birthday Sept. 8 with relatives at the home of his daughter, Mrs. Richard Dwight Hillis, Christmas Cove, Me. Friends in the iron and steel industry sent him a basket of more than 250 letters expressing their regard for him. Mr. Rogers retired from business 15 years ago but goes to his office in Buffalo regularly to attend to his private affairs. At one time Rogers, Brown & Co. were rated the leading pig iron distributors in the world.

♦

L. W. Bertelsen, for more than 20 years associated with Armstrong Cork Co., Lancaster, Pa., on high temperature insulation sales, has resigned to go in the furnace supply and consulting engineering business. In addition, he will act as a distributor of Armstrong brick and will make his offices at 674 Osage road, Pittsburgh (16).

♦

Herbert N. Snowden, associated with John A. Roebling's Sons Co., Trenton, N. J., 20 years, has become general works manager, Seneca Wire & Mfg. Co., Fostoria, O.

♦

L. A. Hull has been elected vice president, Air Reduction Co. Inc., New York. **G. E. Hawkins** has been named vice president in charge of distribution, and **J. E. Fricker,** vice president in charge of engineering.

♦

L. W. Moore has been appointed general purchasing agent, Crane Co., Chicago. He succeeds **D. G. Park,** vice president of purchases, who has retired. Mr. Moore formerly was manager of the company's pipe department.

♦

Truman G. Glenn, for 11 years assistant district engineer, General Electric Co., Chicago, has been appointed engineer of the Detroit office. He replaces **Thomas E. Nicoll,** who will retire Oct. 1 after 38 years with the company.

♦

Oscar E. Hesse has been appointed secretary-treasurer, Logan Engineering Co., Chicago. Formerly credit manager and financial director, Knight Soda Fountain Co., Chicago, Mr. Hesse succeeds **J. I. McTaggart,** who has become secretary-treasurer, C. P. Clare & Co., Chicago.

William A. Rogers

L. W. Bertelsen

♦

James Leslie Goddard has been named manager of the newly created industrial relations department, Plomb Tool Co., Los Angeles. He formerly was secretary and general counsel for Goodyear Tire & Rubber Co. of California.

George E. Winters, formerly production manager, Muskegon, Mich., plant, Continental Motors Corp., Detroit, has been appointed manager of both the Muskegon and Detroit plants. **L. W. Rich,** master mechanic, has become assistant to the vice president; **Kahle Hall,** formerly with Heald Machine Co., has been named factory manager at Detroit, and **E. R. Jacoby,** technical director of engineering at Muskegon, has been transferred to Detroit to assist in Wright aircraft engine production.

♦

Dr. Edward E. Minor, research and development engineer, Glenn L. Martin Co., Baltimore, has been appointed chairman of the committee on air transportation of the American Institute of Electrical Engineers. In accepting the appointment Dr. Minor recommended the following to serve with him: V. H. Grant, Bureau of Aeronautics, United States Navy, Washington; T. B. Holliday, United States Army Air Corps, Wright Field, Dayton, O.; E. E. Johnson, General Electric Co., Schenectady, N. Y.; W. J. Clardy, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; W. J. Morrill, General Electric Co., Ft. Wayne, Ind.; C. F. Savage, General Electric Co., Lynn, Mass.; H. A. Campbell, Solar Aircraft Co., Los Angeles; and J. W. Barker, American Institute of Electrical Engineers, New York.

♦

O. F. Dalstrom, engineer of bridges for more than 24 years, Chicago & North Western railroad, Chicago, retired Aug. 31. He has been succeeded by **A. E. Bechtelheimer,** assistant engineer of bridges. **A. R. Harris** has been named assistant to succeed Mr. Bechtelheimer.

♦

J. P. Debri has been appointed superintendent, Rockdale works, American Steel & Wire Co., Joliet, Ill. He succeeds **Daniel Lynch,** who has retired after 48 years of service.

F. J. Martin, superintendent, hot mills and finishing mills, Duluth works, has been promoted to general superintendent there, and **J. C. Witherspoon** has been made assistant general superintendent. Mr. Witherspoon formerly was superintendent of steel works.

Alfred Osolin, master mechanic at the Cuyahoga works, Cleveland, has been named general master mechanic in the company's main office, while **Robert E. Cramer,** at present with the Donora, Pa., works, has been made special engineer at Cleveland. **William Henry**

has been appointed superintendent of engineering and maintenance at Donora, succeeding Mr. Cramer, while **Axel H. Olson** has become master mechanic at Cuyahoga works to succeed Mr. Osolin. **Carl Rohrer** has been named general foreman of maintenance and construction at Cuyahoga works.

♦

Harry G. Anderson, of the Cleveland office of M. A. Hanna Co., has been appointed chief clerk and purchasing agent, Clifton Ore Co. Inc., DeGrasse, N. Y., a Hanna subsidiary.

♦

L. W. Mason, since 1929 assistant comptroller, Hercules Powder Co., Wilmington, Del., has been promoted to comptroller, succeeding **F. J. Kennerley,** who has become assistant treasurer. **W. S. Harkins** has been appointed assistant to the comptroller.

♦

B. Warfel has been appointed consultant maintenance engineer in the Cleveland area for Flexrock Co., Philadelphia, replacing **W. L. Tench.** His headquarters are in the Euclid Sixty-first building, Cleveland.

♦

Clyde F. Farmer, since 1937 freight traffic manager at Pittsburgh for Baltimore & Ohio railroad, has resigned to become assistant to president, Delaware, Lackawanna & Western Railroad Co., New York.

♦

E. M. Wilcox, assistant superintendent of equipment, New York Central railroad and superintendent of equipment, Indiana Harbor Belt railroad and Chicago Junction railroad, retired Aug. 31 after completing 49 years of railroad service, 39 of which were with New York Central. He will be succeeded by **W. L. Houghton,** master mechanic of New York Central, Chicago.

♦

Dr. Jesse E. Hobson, who has been in charge of application engineering on electric power equipment, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been named director of the engineering department, Illinois Institute of Technology, Chicago.

♦

Arthur C. Helden, resident manager of the Chicago office, General Railway Signal Co., has been named western manager, with jurisdiction over Chicago, St. Louis and San Francisco districts.

♦

F. G. Gardner has become acting chief engineer, Kellogg Switchboard & Supply Co., Chicago, replacing **George R. Eaton,** vice president in charge of engineering, who is on leave of absence because of ill health.

♦

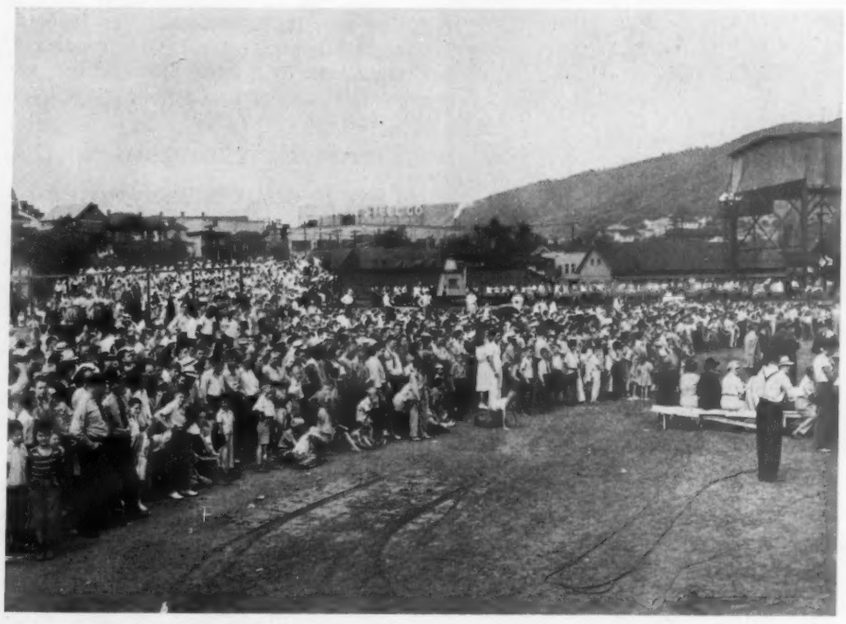
Paul T. Talbott, ceramic engineer, has joined the research staff of Battelle Memorial Institute, Columbus, O., and has been assigned to the division of ceramic research. He formerly was associated with Cerro de Pasco Copper Corp., Peru, South America, as an experimental engineer.

♦

D. W. R. Morgan, George P. Passmore, and **A. P. Craig** will supervise increased expansion and production activities in Westinghouse Electric & Mfg. Co.'s South Philadelphia works.

Mr. Morgan will direct over-all manufacturing operations, both in the South Philadelphia works and the new merchant ship equipment shops. Mr. Passmore takes charge of the industrial relations department, while Mr. Craig will be responsible for co-ordinating the work of all company departments in building and equipping the merchant ship factory buildings.

Steel Town Sees Tanks in Action



■ **Steelworkers and their families in Weirton, W. Va., turned out on Labor day to watch a demonstration of tank maneuvers staged by the Fourth Armored Division, Pine Camp, N. Y., at Weirton Steel Co.'s athletic grounds. Purpose was to show the steel town how its products are translated into weapons. Associated Press photo**

DIED:

■ **Alvan T. Simonds,** 64, president and general manager, Simonds Saw & Steel Co., Fitchburg, Mass., Sept. 2. Mr. Simonds became president in 1913, relinquished the post to his brother, Gifford Simonds, in 1940, and then resumed it after his brother's death last March 20. He was president of Abrasive Co., Philadelphia, since 1927, and was a director of the United States Chamber of Commerce.

♦

Louis R. Davidson, 75, retired industrialist, Aug. 28, at his home in Buffalo. Mr. Davidson was formerly secretary-treasurer and general manager, New York State Steel Co., now Republic Steel Corp., and was organizer and president of Davidson Ore Mining Co., which was sold to Pittsburgh Coke & Iron Co. last year. He also was an officer and director of Union Drawn Steel Co. for many years.

♦

John S. Paul, 45, owner, Ace Screw Products, Chicago, Aug. 30. He organized the business three years ago.

♦

Eckhart H. Brandis, 51, works auditor, American Steel Foundries, Hammond, Ind., at his home in Lansing, Ill., Aug. 26.

♦

Edward B. McClelland, 48, assistant sales manager, air conditioning and commercial refrigeration department, General Electric Co., Schenectady, N. Y., Aug. 23, in Portland, Oreg.

♦

Harry de Forest Madden, 61, general manager, lamp manufacturing and engineering divisions, Westinghouse Electric & Mfg. Co., Bloomfield, N. J., at his summer home in Brielle, N. J., Sept. 1.

MEETINGS

Safety Congress To Organize Nationwide Campaign

■ TEN thousand leaders in safety work are expected at the thirtieth annual National Safety Congress and Exposition to be held in Stevens hotel, Chicago, Oct. 6-10. Five hundred fifty-two will participate in programs, in 162 sessions. Theme is "Help Defense—Stop Accidents." The congress will devote considerable attention to organizing a nationwide campaign against accidents which are said to be hampering the national defense program.

Will Discuss Problems in Industrial Relations

A national conference under auspices of the American Management Association will be held in Benjamin Franklin hotel, Philadelphia, Oct. 1-2, to give companies an opportunity to exchange views and experiences on labor relations problems.

Ohio Steelmakers To Meet at Columbus in October

Ohio section of the Open-Hearth Committee, American Institute of Mining and Metallurgical Engineers, will hold its annual meeting in Deshler-Wallick hotel, Columbus, O., Oct. 17-18. Technical sessions are scheduled for Friday morning and afternoon. At a banquet in the evening Lieut. Commander Carlos Fallon will speak. Saturday morning will be devoted to plant visitation and in the afternoon members will attend the Ohio-Purdue football game. C. R. FonDersmith, American Rolling Mill Co., Middletown, O., is chairman of the Ohio section.

Subcontracting Clinic This Week In Chicago

■ Illinois division of the National Small Business Men's association will conduct a subcontracting clinic in Palmer House, Chicago, Sept. 11-12. Invitations have been sent to 417 prime contractors holding government contracts, and 9000 small manufacturers in Illinois, Northern Indiana and Southern Wisconsin, who could engage in subcontracting. Purpose is to expedite the spreading of government work.

Prime contractors will be represented at tables, classified according to the kind of subcontracting that is available. Small manufacturers will be able to consult with representatives of these contractors, and to describe their facilities, location of plants, and skill of labor forces.

Posters Designed from Experience with Many Fires

■ Posters, tailor-made to meet the particular fire hazards of the steel industry, are a part of a current fire prevention campaign that is being carried out by Bethlehem Steel Co.'s insurance department.

The department has a record since 1918 of more than 45,000 fires which occurred on the company's properties, most of them extinguished before causing great damage. Analysis of the records indicates seven major fire hazards.

Included among poster subjects prepared to date are: Faulty electrical wiring; spilled oil; oily waste; and welding sparks. Additional subjects on which posters are being prepared include: Hot metal, hot chips and borings, and smoking.

Die Typing Process Speeds Defense Forgings

DETROIT

■ After an interval of several years during which time the process of die typing, for production of small and medium-size forging dies, was confined chiefly to certain sections of the automotive industry, the process is now coming into wider use in production of dies for parts required in large quantities in the defense program.

An example is a metallic belt link for .50 caliber machine gun shells, pressed out of steel in a progressive type die in quantities ranging into the millions. By "typing" the dies, much time is saved in their production, and a reduction in die cost is realized.

First described in STEEL, Aug. 15, 1932, the die typing process involves the production of a master embossed die or punch of the part to be produced, from a master cut die. The impression then is transferred to any number of production dies by forcing the master punch or die into the heated die stock.

Currently, dies of this type are being supplied by the Die Typing Corp., 31-35 General Motors building, Detroit, a recently organized company specializing solely in this work. Officers of the company are W. F. Weed, president; L. S. Roehm, vice president; Brewster Loud Jr., vice president, and Jules G. Hoffman, secretary-treasurer. H. E. Beyster, Detroit architect and engineer, is a director.

The typing process is peculiarly suited to jobs where large production or die wear make necessary a number of duplicate dies. Typed dies can be used readily as inserts, and this process permits important reduction in nonproductive time, especially in forging work.

Domestic Manganese Ore Production Higher

■ Domestic production in July of manganese ore containing 35 per cent or more natural manganese was 6000 gross tons, according to the Bureau of Mines, Department of the Interior. Shipments in the period totaled 6200 tons and producers' stocks July 31 were 1100 tons. Figures were predicated on reports received from companies that produced 84 per cent of the total in 1940.

Revised production total for June was 4600 tons, shipments were 4800 tons and producers' stocks at the end of the month, 1300 tons. Increase in production and shipments in June and July was reported due principally to operations at the new nodulizing plant at Anaconda, Mont.

Text of Order Establishing Priorities for Warehouses

■ WAREHOUSES last week were assured of steel for requirements consistent with national defense, in an order signed by Donald M. Nelson, director of priorities.

In a letter addressed to warehouses—about 3000 of them—Mr. Nelson explained the procedure, and enclosed a copy of the order. As there have been many inquiries concerning these, STEEL herewith reproduces the official text.

To All Steel Warehouses and
Their Suppliers.

Gentlemen:

The Director of Priorities of the Office of Production Management is today filing for publication in the *Federal Register* Supplementary Order M-21-b which adds to the General Steel Order (M-21) certain provisions relating specifically to steel warehouses. A copy of this Supplementary Order is attached.

The chief aim of the Supplementary Order is to prevent the excessive accumulation of inventories in warehouses, but to give every assistance to warehouses in obtaining their reasonable requirements, so that small industrial users will not be unduly hampered in obtaining their day to day requirements for defense needs. The proposed procedure to accomplish this is as follows:

1. On or before Sept. 15, 1941, each warehouse shall file with the Director of Priorities a report on Form PD-83a which shall set forth deliveries by the warehouse during the first quarter of 1941 from stock owned and on consignment (but not including orders shipped direct from a mill to customers of the warehouse or items "picked up" from other warehouses). Copies of Form PD-83a are attached and should be completed in accordance with the instructions thereon and returned promptly.
2. Based on those reports, the Director of Priorities will determine what percentage of warehouse deliveries during the first quarter of 1941 should be set as the quotas for deliveries to warehouses for the last quarter of 1941. This percentage of each warehouse's deliveries will be set as its quota for the last three months of 1941, and the Director of Priorities will notify each warehouse on or before Oct. 5, 1941, what such quota is to be. The quota thus established for the last quarter of 1941 shall continue for subsequent quarters until further direction of the Director of Priorities. The Director may from time to time establish different quotas for different classes of steel products.
3. On or before Oct. 5, 1941, the Director of Priorities will issue to each warehouse a certificate assigning a preference rating of A-9 to deliveries to be made to it within the limits of its quota. Each warehouse shall forthwith make copies of its certificate and furnish such copies to its suppliers. The certificate will bear a serial number, which the warehouse must place on all future orders for steel placed with its suppliers.
4. Beginning Oct. 15, 1941, and monthly thereafter, each warehouse shall file with the Director of Priorities reports on Form PD-83a setting forth deliveries to stock and deliveries from stock during the preceding month, including steel held on consignment (but not including orders shipped direct from a mill to customers of the warehouse or items "picked up" from other warehouses). Deliveries are to be reported by group and product classifications in accordance with instructions enclosed. Although the Division of Priorities is not for the present requiring warehouse customers to file classification statements on Form PD-73 with their purchase orders, each warehouse must obtain from its customers when orders are placed such information as will enable the warehouse to complete its monthly Form PD-83a. The reports filed on Oct. 15, Jan. 15, April 15 and July 15 shall also set forth inventories at the end of the preceding quarter.
5. For any false statement, or failure to submit reports when required, or other violation of the terms of any Order or other direction of the Director of Priorities, the warehouse shall be subject to the penalties provided by law, which may include the refusal of permission to receive or make further deliveries.

Another very important provision of the Supplementary Order is that which forbids warehouses to sell alloy steel for other than defense orders, except for certain specified small sales.

This letter does not purport to be a complete summary of Supplementary Order No. M-21-b, and you must read the Order carefully in its entirety so that you may fully understand its provisions and their effect upon your business and relations with your customers.

You will be notified from time to time of rulings and interpretations applying to this Order. Any questions which may arise in connection with your compliance with the

(*Please turn to Page* 125)

Government Forms Are Available

■ Forms PD-73, PD-25-C, PD-25-D which now must be attached to every order or contract for defense supplies are available to STEEL's readers, shipments being made the same day as orders are received.

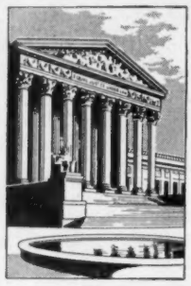
These forms can be obtained from STEEL, Readers' Service Department, Penton Building, Cleveland, at the following prices:

Quantity of		Quantity of	
100	$1.00	1,000	$3.55
200	$1.50	2,500- 5,000	$3.25 per M
300	$2.00	5,000-10,000	$2.95 per M
400	$2.50	10,000-20,000	$2.75 per M
500	$3.00	20,000 and over	$2.55 per M

OPM steel order M-21 is also available at $15.00 *per M*

Windows of *WASHINGTON*

Steel expansion proposal may reach 12,000,000 tons, OPM officials report . . . Scrap dealers requested to increase collections 20 per cent to assure adequate materials supplies for defense . . . Henderson says price schedules issued by OPACS will remain in effect . . . Research laboratories granted A-2 priority status on scarce materials . . . Truck manufacturers given A-3 rating, same as freight car builders



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ "IT IS not beyond the realm of possibility that the proposed 12,000,000-ton steel expansion program may have to be further extended, especially if this country undertakes to supply any great amount of material to Russia," OPM officials said last week.

When the program was formulated, aid to Russia was not considered.

The report on the steel expansion program, which was completed some time ago, still is being held up because of problems which have arisen in connection with financing.

Among other problems is that of financing extensions to existing plants and equipment to be installed in existing plants. To date most of the funds loaned for defense plants were for new plants and equipment which could be taken over by the Defense Plant Corp., if necessary. The "scrambled facilities" expansion, however, presents a more confusing problem.

OPM officials were quick to point out that the delay indicates no reluctance on the part of Loan Administrator Jones to lend the funds. Mr. Jones, OPM steel experts and the President agree it is better to expand existing plants than to build entirely new ones, it was said.

20 Per Cent Increase in Scrap Collections Asked by OPM

Office of Production Management last week asked waste and scrap dealers to increase collections by 20 per cent to insure an adequate supply of materials for defense plants and less essential industries.

The request was made at a meeting called to receive nominations for an industry advisory committee to be named to work with defense officials on plans to increase the collections. The committee will represent small, medium and large dealers, will be geographically representative. It will include three men from each of the following divisions: Iron and steel scrap; nonferrous metals scrap; scrap rubber; paper wastes; woolen rags and cotton rags.

R. C. Allen, of the OPM iron and steel section, told the dealers that the shortage of iron and steel scrap would become more acute during the next two years and until new blast furnaces are brought into operation.

OPACS Price Schedules To Continue in Effect

All price schedules issued by the former OPACS remain in full force and effect regardless of the change of name announced in the President's executive order of Aug. 28, according to Leon Henderson, price administrator.

Activities of the consumer division of the office will not be affected by the transfer of civilian allocation work to the OPM, Mr. Henderson said.

Miss Harriet Elliott continues as associate administrator of the Office of Price Administration, and in that capacity will continue to direct the broad program of activities which she has developed to protect the interests of consumers during the emergency.

Eight More Chemicals Placed Under Full Priority Control

Eight more chemicals were placed under full priority control by the OPM Priorities Division last week. They are: Ethyl alcohol, methyl alcohol, potassium perchlorate, potassium permanganate, toluene, tricresyl and triphenyl phosphates, phenols and phosphorus oxychloride.

An A-10 rating has been assigned to defense orders for all of the eight chemicals, unless a higher order is specifically granted. Defense orders must be accepted by producers.

The alcohols are used for making explosives and methyl alcohol also is used in plastics. Potassium perchlorate is used in making flares for aviation and ordnance use. Potassium permanganate is essential as a purifier for metal alloys. Toluene is used in making TNT and DNT.

Tricresyl and triphenyl phosphates, phenols and phosphorus oxychloride are employed directly or indirectly in the production of degaussing cables for the Navy to provide protection from magnetic mines.

The formaldehyde order issued earlier was amended to assign a rating of B-4 to deliveries of synthetic resins essential to the civilian articles enumerated in classification 1 on the original order, and a rating of B-8 to those in classification 2.

Research Laboratories Granted A-2 Rating for Scarce Materials

Research laboratories have been granted a priority rating of A-2 to aid them in obtaining scarce materials. In issuing the order the OPM Priorities Division pointed out the great importance of research to the defense program and to the public.

The division has obtained the assistance of the National Academy of Sciences in the operation of the new research laboratories supplies plan. The Academy will advise upon applications from laboratories for assistance.

A laboratory experiencing difficulty in obtaining essential materials, and wishing to qualify for the A-2 rating, should apply to the Chemical Branch, Office of Production Management, Washington, on Form PD-88.

The preference rating may be extended as far as necessary to assure ultimate delivery of scarce materials to the laboratory. A laboratory, when applying for the ratings, should specify the number of copies of the order which will be necessary to enable its suppliers to serve them upon their own subsuppliers. No extensions of the rating to suppliers

will be made directly by the Priorities Division. This must be done by the laboratory itself.

In the event that the laboratory finds itself unable to obtain some essential material with the A-2 rating, it should file an application with the Priorities Division on Form PD-1. If the research project is deemed of sufficient importance, the Priorities Division will issue an individual preference rating certificate, assigning a higher rating to a particular delivery of specified material.

About 2000 research laboratories use small quantities of about 5000 chemicals and require in their operation 25,000 different instruments.

Status of Lake Copper Clarified In Price Schedule Amendment

Status of lake copper in the copper price schedule (STEEL, Aug. 12, p. 33), has been clarified by an amendment issued by the Office of Price Administration.

Amendment adds an exact specification for lake copper to Appendix A and it is stipulated that the same delivery differentials shall apply to lake copper as are provided for electrolytic copper.

Prior to issuance of copper price schedule, lake copper sold at a small premium over electrolytic copper in the Connecticut Valley and at a slight discount below electrolytic in the Chicago area. By placing electrolytic and lake copper on the same basis at all points, operation of the priorities order of the OPM was facilitated.

The schedule also has been changed so as to place casting copper on an f.o.b. refinery basis, instead of a delivered Connecticut Valley basis, thus recognizing prevailing industry practice and preserving the differential between electrolytic and casting coppers.

A further refinement of the schedule is embodied in a change of the word "bought" to "acquired" in the section dealing with prior commitments. By this change dealers may apply to OPA for permission to complete less-than-carload-lot sales at higher than ceiling prices where the copper involved was purchased in carload lots prior to July 1, 1941, but was delivered on or after that date. This will protect dealers in such a position from inventory loss.

Provision also is made under the amendment to allow completion of certain firm commitments beyond Dec. 31, 1941, through application to OPA.

Truck Manufacturers Given Blanket A-3 Priority Rating

To facilitate production of heavy trucks, medium trucks, truck trailers and passenger carriers essential to the defense effort, manufacturers of these vehicles have been granted a blanket priorities order bearing a rating of A-3 by the OPM. The rating is the same as that assigned for freight cars.

The assistance being extended to truck builders is based on estimates that 1,189,000 trucks, or 200,000 more than produced in the last model year, will be required in the current model year, which began Aug. 1.

The rating applies to heavy trucks (3 tons or more); medium trucks (1½ tons or more); truck trailers (5 tons or more); public passenger carriers (motor or electric coaches with not less than 15 seats); and to all replacement parts for these vehicles.

Each producer must apply for use of the rating individually. He may extend the rating to his suppliers by serving official copies of the order on the suppliers; these suppliers may in turn extend the rating to their suppliers in like manner.

No limitation is placed on the production of heavy trucks or any replacement parts. Medium trucks, truck trailers and public passenger carriers may be produced at the going rate of the first half of this year for civilian use; no limitation is imposed on these items for defense purposes.

Net effect of the order will be to expedite production of heavy trucks at the present peak rate and to facilitate production of other trucks covered by the order at the going rate. Although these other vehicles are limited, the rating will permit production at a higher rate than would be the case if the rating were not to be used to obtain materials.

Since part of the available supply of materials will be diverted to medium and heavy truck manufacture, the supply will become even tighter for the production of light trucks and ordinary passenger cars.

Capital Street Yields Scrap Steel for Defense

■ **Familiar scene in many American cities is that of workmen removing rails of abandoned street car lines to provide scrap steel for the national defense program. This photo was snapped on Connecticut avenue in Washington. Wide World**

Transportation Division Listing Available Warehouse Buildings

Survey of vacant buildings suitable for warehouses has been undertaken by the Transportation Division, Office for Emergency Management, in co-operation with the American Warehousemen's Association.

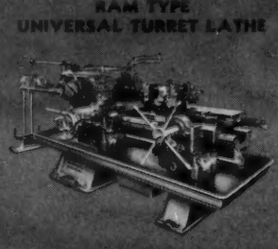
The association is forming a nation-wide committee of volunteer workers to assist the staff of Harry D. Crooks, consultant on warehousing in the Transportation Division.

Committee members have been sent information cards which when filled out and returned will be the nucleus of a file of vacant buildings in about 200 cities of over 25,000 population. The remainder of the cities in this category, about 200 more, will be covered as soon as additional committee members are appointed.

ASAHEL HUBBARD

IN 1835 Asahel Hubbard rode home astride a fine white horse. The horse was a gift from grateful citizens of St. Louis, where Mr. Hubbard had installed a rotary pump to assure the first continuous supply of water to the town. This pump he had transported more than a thousand miles by raft and ox cart, after designing and building it in the Vermont shop, of which today's Jones & Lamson Machine Company is a direct successor.

Jones & Lamson Automatic Thread Grinder Model TG-615



did a job for YOU!

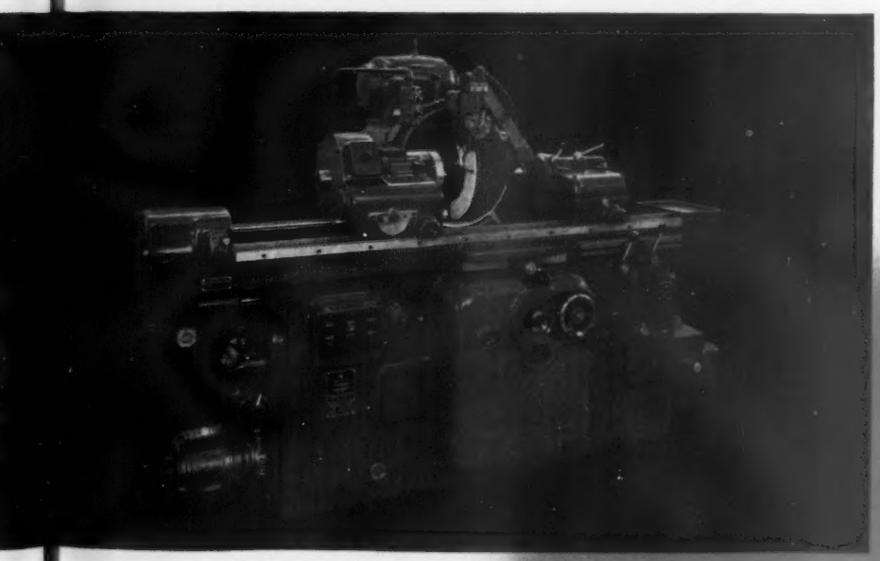
MOST people never heard of Asahel Hubbard. The machines he built no longer run, but in building them he did a job for you. He pioneered advances in engineering, management and precision workmanship that industry takes for granted today. And so did many other men, like Hedge, Kendall, Lawrence, Howe and Hartness whose labors marked the progress of this company and its predecessors.

Today Jones & Lamson engineering is *continuing, broadening and speeding up* a progress which long ago began—*and which has never stopped.*

That is why modern Jones & Lamson machine tool technique is ready to meet today's emergency and help you safeguard profits in tomorrow's competition.

That is why it pays to put production problems up to Jones & Lamson engineers. Inquiries from large companies or small receive prompt, complete and careful study here.

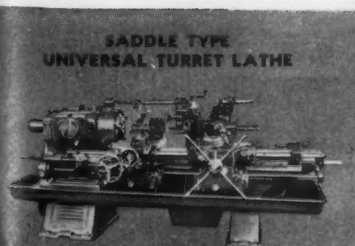
JONES & LAMSON
MACHINE COMPANY · Springfield, Vermont, U. S. A.

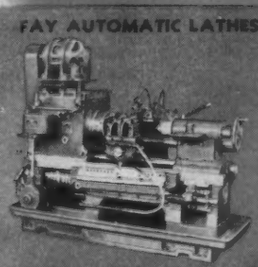


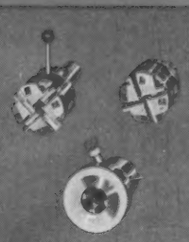
Jones & Lamson Automatic Thread Grinder Model TG-1245

Manufacturers of

Ram & Saddle Type Universal Turret Lathes . . . Fay Automatic Lathes . . . Automatic Thread Grinding Machines . . . Comparators . . . Automatic Opening Threading Dies and Chasers.







J&L

PROFIT PRODUCING
MACHINE TOOLS

OPM Expands and Strengthens Priority Control Over Tungsten

WASHINGTON

■ A NEW general preference order and a civilian allocation order expanding and strengthening the control over tungsten in all forms has been issued by the Priorities Division and Division of Civilian Supply of OPM.

An order covering some forms of tungsten originally was issued March 26. The new order supersedes this and includes ores, concentrates, ferrotungsten, tungsten metal powder, chemical compounds of tungsten and scrap or secondary material containing commercially recoverable tungsten.

Main changes made in the control include:

(1) Ores and concentrates, not covered in the previous order, are covered in the new regulation.

(2) Producers of tungsten in all forms are required to accept defense orders.

(3) An allocation system is set up to regulate distribution of ferrotungsten, tungsten metal powder and tungsten chemicals going into metal powder.

(4) Processors of tungsten in chemical form, other than those forms going into tungsten metal powder, are generally limited in their processing or purchasing to 90 per cent of amounts processed or purchased during the 12 months ended June 20, 1941. This is in accordance with the civilian allocation program.

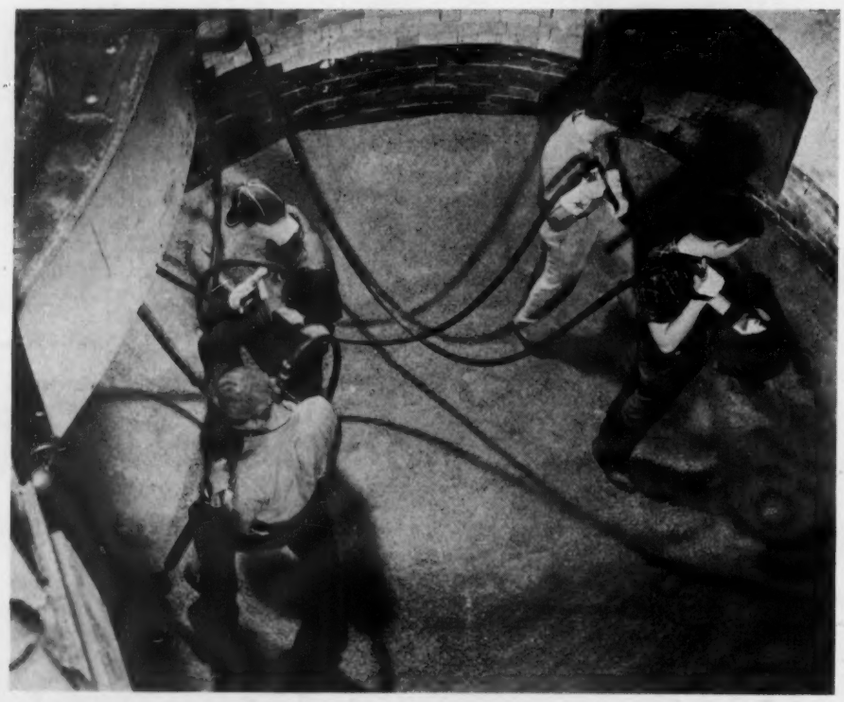
Produced both in this country and in the Far East, tungsten's major use is in the production of cutting tools. Shipping difficulties have threatened the 1941 supply, and available data indicate that there will not be enough to meet all needs.

Inventories Restricted

Because of the necessity for conserving the supply, the new order contains restrictions against building up excessive inventories. It is provided that tungsten shall not be shipped to any person in amounts which would increase that person's inventory of tungsten to an unnecessary level.

Provisions for direct allocation of tungsten materials apply only to ferrotungsten, tungsten metal powder and tungsten chemical compounds to go into metal powder. The order provides that, beginning Sept. 1, 1941, no person shall make delivery of these forms of tungsten without the specific authority of the Director of Priorities. During each calendar month the director will determine the allocation of available supplies among competing consumers.

Another Electric Furnace Completed



■ **Workers ram in the bottom of a new 35-ton electric furnace at the Allegheny Ludlum Steel Corp. plant, Brackenridge, Pa. Two days after this photo was taken the furnace was placed in operation to produce alloy steel for defense purposes. The plant is being expanded at record speed. OEM defense photo by Palmer**

Price Administrator "Suggests" 90-95-Cent Price for Cadmium

Major producers of cadmium have indicated to the Office of Price Administration their willingness to continue to sell that metal at prices not above 90 cents a pound for sticks and 95 cents a pound for anodes, in the case of direct sales to users, and to sell to dealers at discounts which will permit resales to consumers at not above 90 and 95 cents, Leon Henderson, administrator, announced last week.

Prices above these levels are considered excessive and consumers are requested not to pay them.

If cadmium is needed urgently and cannot be obtained at these prices, Mr. Henderson suggested that consumers communicate with the OPM. In any event, he added, cadmium users asked to pay excessive prices should report the matter to the Office of Price Administration.

Sees 90,000,000 Pounds Magnesium Output in '42

■ United States and England now are equalling Germany in the production of magnesium and next year will exceed Germany's output. American production of this strategic metal has increased from 6,000,000 pounds in 1939 to 12,000,000 pounds in 1940. Output in 1941 is estimated at 30,000,000 pounds, which will increase in 1942 to 90,000,000 pounds, according to R. H. Harrington, metallurgist in the General Electric Research Laboratory, Schenectady, N. Y.

The remarkable expansion, he said, is made possible by new plants using sea water as a source. There are about 4,500,000 tons of magnesium in a cubic mile of sea water. "Thus only one cubic mile of sea water will furnish 90,000,000 pounds of metal each year for 100 years."

Magnesium and its alloys are used not only for reduction in dead weight (it is only two thirds as heavy as aluminum), but also for less inertia because of light weight, for lower pressure bearings, easier rotating balance, for reduced centrifugal forces in rotating parts, resistance to vibration failure, and for certain advantages in high production fabricating methods, such as die castings.

Dominion War Orders $24,863,393 in Week; $1,134,962 Awarded U. S. Firms

TORONTO, ONT.

■ Defense orders placed by the Canadian Department of Munitions and Supply in the week ended Aug. 19 totaled 3254, with $24,863,393 aggregate value. Combined value of awards to steel producers in the period was $1,814,775. United States manufacturers received contracts totaling $1,134,962. Awards included:

Ordnance: Dominion Foundries & Steel Ltd., Hamilton, Ont., $1,113,642; Atlas Steels Ltd., Welland, Ont., $223,239; Anaconda American Brass Ltd., New Toronto, Ont., $85,668; John Inglis Ltd., Toronto, $67,215; Wright Industries Ltd., Toronto, $5818.

Munitions: General Steel Wares Ltd., Toronto, $746,000; National Cash Register Ltd., Toronto, $118,634; Metal Stampings Ltd., Toronto, $11,540; Anaconda American Brass Ltd., New Toronto, $17,064; Canadian Car & Foundry Co. (Munitions) Ltd., Montreal, Que., $58,500; Crane Ltd., Montreal, $160,650; Overseas Requisition, England, $15,120.

Metals: Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., $477,890; Consolidated Mining & Smelting Co. Ltd., Montreal, $74,601.

Shipbuilding: Malcolm L. Spears, Sheet Harbor, N. S., $30,000; Halifax Shipyards Ltd., Halifax, N. S., $103,530; George Roy McWilliams, Newcastle, N. B., $5500; Marine Industries Ltd., Montreal, $4,190,956; Hunter Boats Ltd., Orillia, Ont., $85,000.

Land transport: General Motors Products of Canada Ltd., Oshawa, Ont., $1,467,445; Metallic Roofing Co. Ltd., Ottawa, Ont., $23,274; Dominion Truck Equipment Co. Ltd., Kitchener, $91,897; Chrysler Corp. of Canada Ltd., Windsor, Ont., $19,307; Ford Motor Co. of Canada Ltd., Windsor, $1,978,780.

Aircraft: Canadian Wright Ltd., Montreal, $2,293,531; Charles A. Pender, Halifax, N. S., $5000; Canadian Car & Foundry Co. Ltd., Montreal, $6929; Noorduyn Aviation Ltd., Montreal, $25,315; Link Mfg. Co. Ltd., Gananoque, Ont., $119,149; Stewart Warner Co. Ltd., Belleville, Ont., $6136; Fairgrieve & Son Ltd., Toronto, $9502; Wagner Brake Service, Toronto, $23,008; National Steel Car Corp. Ltd., Malton, Ont., $106,142; Fleet Aircraft Ltd., Ft. Erie, Ont., $8066; Canadian Westinghouse Co. Ltd., Hamilton, $910,149; MacDonald Bros. Aircraft Ltd., Winnipeg, Man., $14,605.

Instruments: Canadian Marconi Co. Ltd., Montreal, $11,152; Research Enterprises Ltd., Leaside (Toronto); $45,000; Stanley Mfg. Co. Ltd., Toronto, $56,938; Ontario Hughes-Owens Co. Ltd., Ottawa, $14,944.

Electrical equipment: Overseas Requisition, England, $78,560; Canadian Marconi Co., Montreal, $96,659; Gatineau Power Commission, St. Jerome, Que., $5424; Canadian General Electric Co. Ltd., Ottawa, $7800; Canadian Telephones & Supplies Ltd., Toronto, $6347.

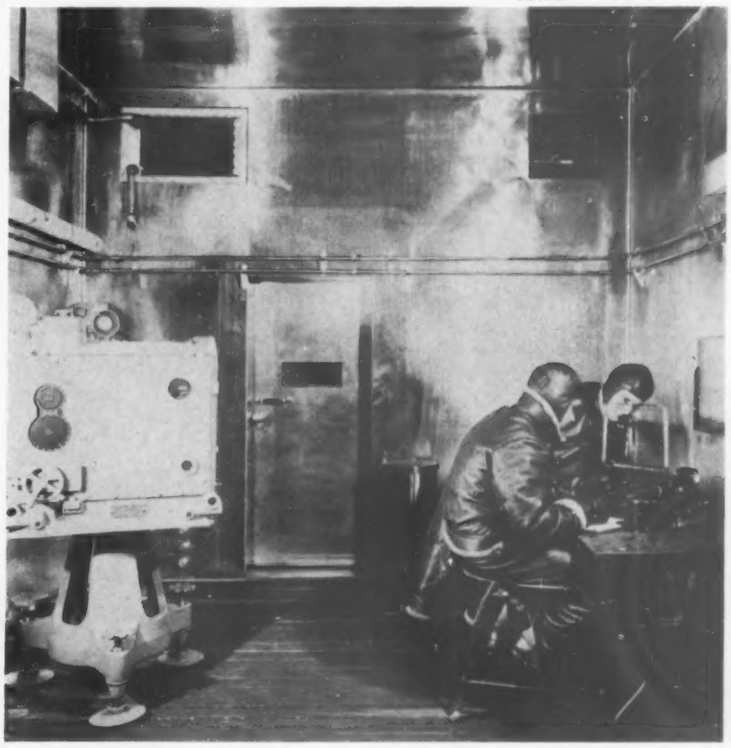
Machinery: Canadian Liquid Air Co., Montreal, $7230; Walter Kidde Ltd., Montreal, $19,736; Williams & Wilson Ltd., Montreal, $27,221; Corman Engineering Co. Ltd., Toronto, $25,253; A. R. Williams Machinery Co., Toronto, $14,295.

Construction projects: Acadia Construction Co. Ltd., Halifax, N. S. $77,957; Newton Construction Co., Sherbrooke, Que., $282,907; E. G. M. Cape Construction Co. Ltd., Montreal, $600,000; Rayner Construction Co., Leaside, $281,740; W. C. Brennan, Hamilton, $356,536; Marweli Construction Co., Vancouver, B. C., $756,393; E. J. Ryan Construction Co., Vancouver, B. C., $76,950; Hill-Clark-Francis Co., New Liskeard, Ont., $100,000; Carter-Halls-Aldinger Co. Ltd., Toronto, $200,000; T. C. Gorman Co., Montreal, $300,000; Acadia Construction Co. Ltd., Halifax, N. S., $300,000; Atlantic Construction Co., Halifax, N. S., $300,000.

Miscellaneous: Pictou Foundry & Machine Co., Pictou, N. S., $150,000; Quebec Power Co., Quebec, Que., $59,000; Howard Furnace Co., Toronto, $10,000; C. M. Miners Construction Co., Saskatoon, Sask., $31,000; Carter-Halls-Aldinger Co. Ltd., Winnipeg, Man., $7000; F. W. Flett, Cardston, Alta., $71,000; Connolly & Twizell, Montreal, $50,000; Waterous Ltd., Brantford, Ont., $30,000; Universal Plumbing & Heating Co., Toronto, $10,000; Kelly & Cranckneil, Toronto, $17,000; Horton Steel Works Ltd., Toronto, $90,000; Matheson & Phillips, Charlottetown, P. E. I., $13,000; Defense Industries Ltd., Montreal, $5310; Premier Vacuum Cleaner Co., Toronto, $7778; Beatty Bros. Ltd., Fergus, Ont., $15,109; Canadian Comstock Co. Ltd., Toronto, $12,780; C.-O.-Two Fire Equipment Co. of Canada Ltd., Toronto, $9608.

◆

■ **This metal-lined "all weather" laboratory of Sperry Gyroscope Co., Brooklyn, N. Y., was designed for special testing of aviation equipment in Arctic cold, tropic heat, rain or fog, all created artificially. In this picture, two engineers in fur-lined flying suits are testing equipment under conditions of 35 degrees below zero. At left is an anti-aircraft detector, which automatically trains a gun on an approaching airplane. Photo, Aeronautical Chamber of Commerce**



Canada Repeats New High In Steel, Iron Output

■ Canada's production of steel and pig iron in seven months this year made an all-time record, ingots and castings output gaining 19.3 per cent over the corresponding period in 1940; pig iron 12.7 per cent and ferroalloys 122.9 per cent.

Production of steel ingots, direct steel castings and ferroalloys in July was greater than in June, but pig iron output was less due to one blast furnace being blown out for repairs. Eight of the ten stacks in the Dominion are in production, 79.4 per cent of capacity. Comparisons follow, in gross tons:

	Steel ingots, castings	Pig iron	Ferro-alloys
July 1941 ..	197,316	102,005	17,599
June 1941 ..	187,163	112,313	14,699
July 1940 ..	169,577	95,924	9,257
7 Mos. 1941 ..	1,345,751	727,556	150,479
7 Mos. 1940 ..	1,127,823	645,551	67,501

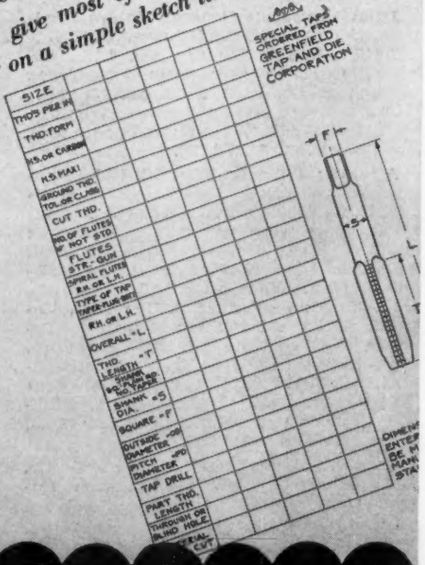
Canadian foreign trade shows substantial gains. Imports in July were $127,707,343, compared with $89,496,233 in July, 1940, and $57,980,050 in July, 1939. Seven months imports totaled $772,991,759, exceeding the entire year 1939, at $751,055,534. July exports were valued at $169,684,572, compared with $100,782,062 in July, 1940, and $75,753,394 in July, 1939. Exports for seven months totaled $828,051,404, which approached the total of $924,926,104 for all 1939.

14 POINTS on SPECIAL TAPS

OLDSTERS remember Woodrow Wilson's "14 points." Here are 14 that are often overlooked, which have to do with ordering special taps. If you can remember to check each one when you order (and furnish a sketch or blueprint, too) your special taps will be *right* and properly suited to the work to be performed.

1. State exact cutting size, number of threads per inch, and form of thread. (If Multiple Thread, state the *lead* in inches and whether Double, Triple, etc. Example: 1"—8 Acme ¼" Lead Double.)
2. Is right or left hand thread required?
3. What style of tap is wanted, Taper, Plug or Bottoming Hand Tap, "Gun" Tap, Nut Tap, Tapper Tap, Pulley Tap, etc.?
4. Should taps be High Speed or Carbon Steel?
5. Are taps to be furnished with cut or ground threads?
6. If threads are to be ground, what class of fit is to be produced?
7. What is overall length; thread length; style, length and diameter of shank?
8. How many flutes, if not standard, and shall they be straight, spiral or "*Gun*?"
9. If spiral flutes are wanted, should they be right or left hand spiral?
10. What length of thread is to be cut?
11. Will tap be used in "through" or blind holes?
12. What is size of hole before tapping, and what is depth of hole to be tapped?
13. What kind of material is to be tapped?
14. Are taps to be used by hand or in a machine? If machine, advise type.

You can give most of the information briefly and correctly on a simple sketch like this.



GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 2102 West Fort St.
WAREHOUSES in New York, Chicago and Los Angeles
GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.
In Canada:

GTD GREENFIELD
TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

Mirrors of *MOTORDOM*

Materials changes raise costs, but will have no appreciable effect on quality of new cars . . . Chief problem now is to develop alternate specifications for bright finishes which are slated to be out after first of year. Paint and plastics being readied to fill in when chromium goes . . . Industry has a "fighting chance" to make 2,145,000 cars in the coming year, but no guarantee of receiving necessary materials

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ THE other morning the president of one of the larger motor companies sauntered into a hotel dining room to have breakfast with a number of associates. Pinned in his lapel was a large and brilliant flower, the cynosure of all eyes. Noting the attention his floral decoration was receiving, he gestured to some of his co-workers and said sadly, "It's a substitute, boys, made out of rubber."

While there are a few "substitutes" in the 1942 models thus far displayed, and probably will be a lot more by the end of the year, about the only effect of such changes has been to increase costs. Certainly no backsliding on appearance or performance can be discerned—yet. As W. S. James, chief engineer of Studebaker Corp. recently told newspaper men at South Bend, Ind., "If the engineering department has permitted any impairment of quality in our cars, we will probably be looking for new jobs."

Summarizing material changes in 1942 lines, R. E. Cole, vice president in charge of Studebaker engineering, reports, "The outstanding substitutions that have been made involve stampings for die castings, occasioned by the shortage of zinc.

"Another example is where it has become necessary to make a substitution for nickel steel in gears. Because of the high priority rating of nickel steel, it has become necessary to use Amola steel, which eliminates nickel and which is functionally just as good. The reason for not having used Amola previously is because of the inability of steel mills to produce this type of steel in large enough quantities to supply the industry.

"This steel gives a somewhat better surface hardness than the 3½ per cent nickel steel. We have been using it in one or two instances over a period of two or three years during which time we have demonstrated that this substitute is just as good or better than the nickel steel.

"Another example of a substitution is the adoption of semisteel pistons for aluminum alloy. The question of the relative merits of aluminum versus semisteel pistons always has been a subject of hot debate among the industry's engineers. As a matter of fact, engineering advances in both the aluminum piston and the old-type cast iron piston have been made so that either type is thoroughly acceptable. It is possible to use smaller bearings when aluminum pistons are used, but most car manufacturers, including Studebaker, have sufficient margins so that the shift to semisteel pistons creates no problem.

"Further in regard to pistons, whereas we previously coated them with tin, on account of the shortage of tin it has been necessary to phosphate-treat them now."

Time Will Tell Worth Of Piston Materials

While it is true that ounce for ounce there may be little to choose between cast iron and aluminum in pistons, most of the new iron pistons are from 50 to 75 per cent heavier than those they are replacing and in several cases there have been some bearing changes to accommodate the extra weight. Packard is an exception, for the reason that the aluminum pistons now in use weigh about 24 ounces each, and the cast iron alternate scales 26 ounces, so the increase is almost negligible. In fact, it is reported that dynamometer tests at Packard on engines with iron pistons showed in some instances even better performance than with aluminum pistons.

Proof of the piston problem will have to wait a few months until the new cars have been on the road a while. Time and again it has been demonstrated that all the dynamometer and proving ground tests in the world fail to duplicate service conditions, even though loads, speeds and operating conditions are made much more severe than those ever encountered in service. Certainly no reason can be advanced now for expecting any piston trouble, but a final check cannot be made until some time next year.

A feature of the Studebaker preview was a question-and-answer session with company officials, the above comment being portions of some of the answers. Other interesting points which developed included the admission by Mr. Cole that further substitutions will be necessary, the replacement of bright work being one, which incidentally was referred to here two weeks ago. All the motor companies are concentrating on this problem right now and it is one of the toughest the industry has had to face. Particularly is this true in view of the additional emphasis placed on bright work in present versions of 1942 models.

Paint and Plastics Seen Chromium Replacements

Here is one slant on how to remove most of the bright work from cars and still have a reasonably snappy appearance commensurate with the demands of today's styling. It represents the conception of George W. Walker, industrial designer and stylist, who has had a hand in automobile styling and consumer goods designing for some years. He sees the possibility of changing radiator grilles and radiator and fender decorations to painted steel, using a contrasting shade of paint to set them off distinctively. Such treatment might possibly create three-tone body colors—one shade for the lower half of the body, one for the upper half and a third

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contrasting color for grille and trim.

For belt moldings and inside door trim, extruded plastic sections show interesting possibilities. At the present time it is possible to obtain these sections without any priority interference and in sample cars they have been installed by attaching them first to steel strip backing which in turn is snapped onto the body. They are said to show fairly good weathering qualities and are nearly the equal of chromium plate in "catching the highlights."

Hub caps and door handles can be finished suitably by making them of steel stampings and dipping in plastic, either clear or colored. Bumpers and outside door handles will continue to be finished in chromium, according to present indications, no entirely satisfactory substitute having been evolved for these applications.

A new design of bumper has been developed in which only the ends and bumper guards are plated, the balance being painted.

While paint and plastic probably can "carry the ball" during the interim that chromium plate is off the list, the overall appearance of cars with these new finishes is bound to suffer in the eyes of a large section of the public which demands its bright metal in large doses on passenger cars.

Questioned about possible shortages and bottlenecks in vital parts and accessories for 1942 models, Paul G. Hoffman, Studebaker president, declared the industry "has a fighting chance to get materials for 2,145,000 passenger cars in the 1942 model season. In other words, that is the ceiling put on business without any guarantee from the government that the materials will be available. Accessories fall right in the same group. If we can't get accessories or parts, we can't build automobiles. We think that we and the accessory companies have a fighting chance to get enough material to build and equip that number of cars."

Mr. Hoffman pretty well summed up the basic thinking of the automobile industry in his closing remarks by saying, "We look upon difficulties that we face as something to be overcome. We look on this period immediately ahead as a period of opportunity and not disaster, and we believe that no manufacturer, if he is willing to engage in that most impressive of human activities—namely, thinking and thinking hard, thereby gaining resourcefulness—is going to suffer."

According to the production allocation program now supposedly in effect for passenger car manufacture, prospects for production over the next 11 months are as follows:

	Period ending Nov. 30, '41, Definite	Model year ending July 31, '42, Prospective
General Motors	361,815	950,956
Chrysler	188,849	496,351
Ford	151,845	399,092
Studebaker	35,289	92,755
Hudson	25,874	67,999
Nash	21,972	57,846
Packard	23,056	60,598
Willys	7,768	20,415
Crosley	333	874
Total	816,801	2,146,786

These figures do not include trucks of 1½ tons capacity and over, which now are assigned A-3 priority and which may add another 600,000 units to the above figures if present plans mature.

The allocation program has played havoc with a good many early production schedules for 1942 models. Thus Ford at one time was contemplating 5000 units a day for 50 days starting the latter part of July. This had to be thrown out and was revised downward to 4000 a day for the period. Meanwhile the original starting date had been passed and still no final determination of schedules made.

It remains to be seen whether allocation figures, arrived at after weeks and weeks of protracted deliberation and study in Washington, will have any particular significance. The crux of the problem is materials and, despite the "fighting chance" conceded by Mr. Hoffman, there is no definite assurance that repeated supply constrictions may not develop as the season goes on. In fact, it is becoming more and more certain here that the gage of production of motor cars will be availability of materials and parts, and not artificially imposed ceilings. About all the latter represent is some good practice for overworked Washington clerks and statisticians.

Automobile Production

Passenger Cars and Trucks—United States and Canada

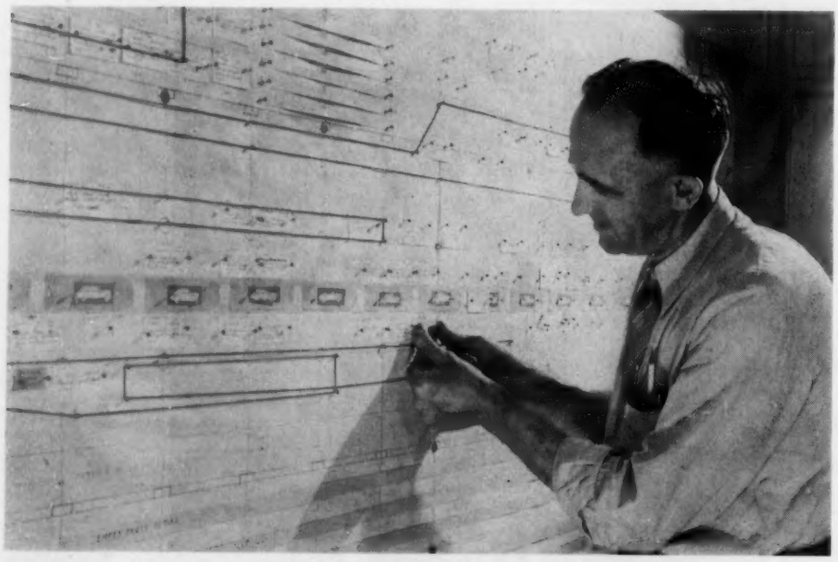
By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,355
June	324,253	362,566	546,278
July	218,600	246,171	468,757
7 mos.	2,274,348	2,785,611	3,617,510
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

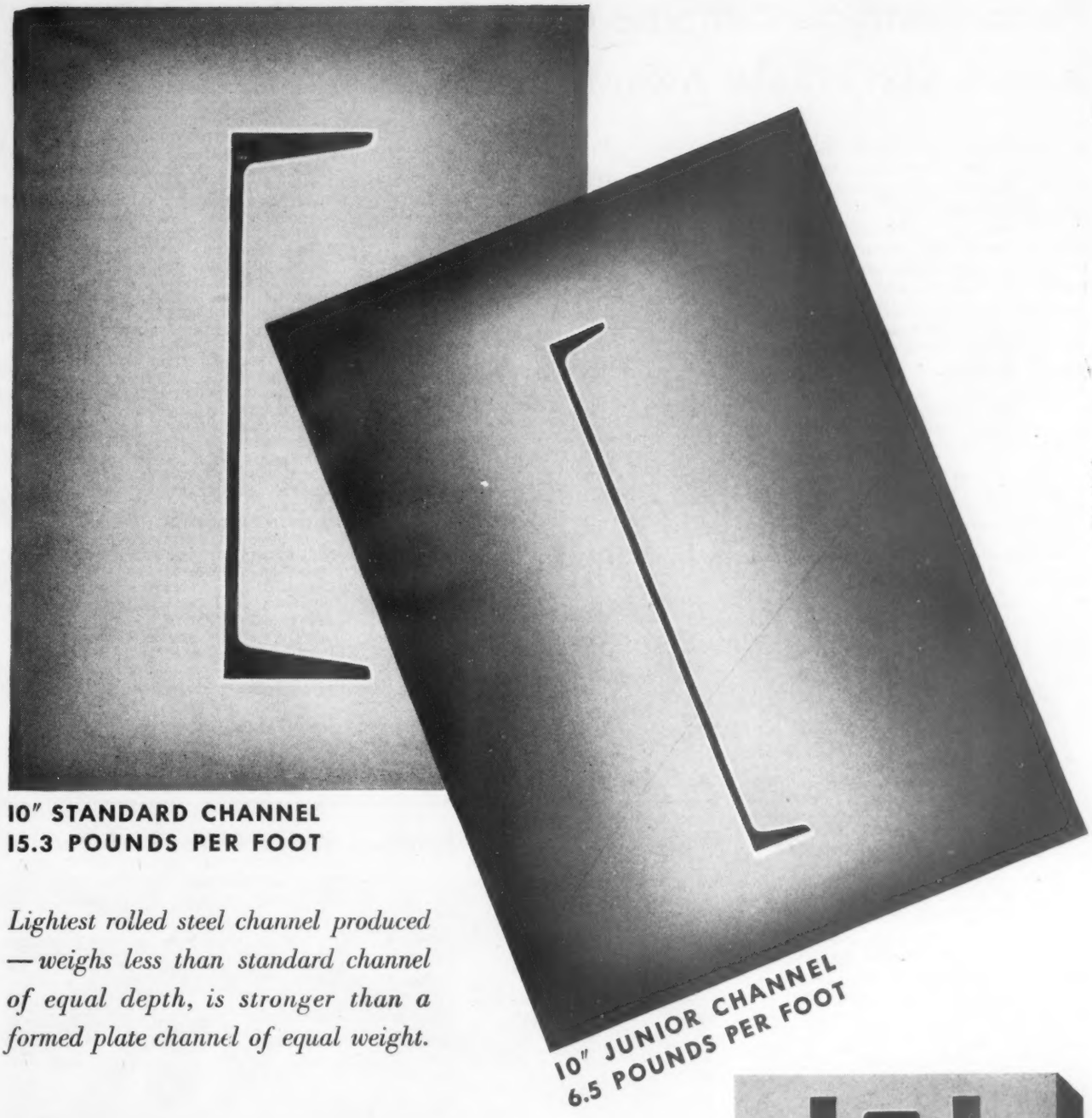
Estimated by Ward's Reports

Week ended:	1941	1940†
Aug. 9	41,795	12,635
Aug. 16	46,750	20,475
Aug. 23	45,525	23,732
Aug. 30	39,965	27,645
Sept. 6	32,940	39,665

†Comparable week.



■ Paper scale (1/8-inch to the foot) models of equipment, strings for conveyor lines and tags for cars in process of assembly are used in this layout board developed for 1942 model operations at the Cadillac Motor Car Division, Detroit. Cards pinned on the board at work stations carry details of operations involved and time card numbers of workmen. The entire plant, covering 9 acres and including six units—body, chassis, sheet metal, final assembly, accessory assembly and final inspection—is condensed onto these "assembly templet boards" which help to maintain maximum plant efficiency and to make quicker readjustments in assembly rates



10″ STANDARD CHANNEL
15.3 POUNDS PER FOOT

10″ JUNIOR CHANNEL
6.5 POUNDS PER FOOT

Lightest rolled steel channel produced — weighs less than standard channel of equal depth, is stronger than a formed plate channel of equal weight.

CONTROLLED QUALITY JUNIOR CHANNELS

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON & STEEL WORKS • PITTSBURGH, PA.

Plane Contracts Comprise Over Half Army's $429,720,860 Awards in Week

■ DEFENSE contracts reported last week by the War Department totaled $429,720,860, substantially higher than aggregate of awards in recent weeks. Contracts for airplanes, parts and accessories again comprised more than half the week's total, with Douglas and Bell Aircraft topping the list. Ordnance Department awards were numerous, but most individual contracts were for small amounts. The awards included:

Bell Aircraft Corp., Buffalo, airplanes and spare parts, $75,218,384.

Douglas Aircraft Corp., Santa Monica, Calif., airplanes and spare parts, $176,316,690.

McQuay-Norris Mfg. Co., St. Louis, $1,720,267 supplementary contract for equipping and operation of an armor-piercing core plant in connection with the small arms ammunition plant at St. Louis.

North American Aviation Inc. of Texas, Dallas, Tex., airplanes and spare parts, $6,980,612.76.

Stone & Webster Engineering Corp., New York, $34,245,732 for designing, constructing and procuring equipment for Volunteer Ordnance Works at Chattanooga, Tenn. Plant, to manufacture TNT, will be operated by Hercules Powder Co., Wilmington, Del. Latter company is to furnish management services during construction, train key personnel and operate the plant for one year with government holding option for renewal. Estimated cost of the service and one year's production is $12,742,842.

Wright Aeronautical Corp., Paterson, N. J., miscellaneous maintenance parts for aeronautical engines, $19,268,820.36.

Ordnance Department Awards

Adirondack Foundries & Steel Inc., Watervliet, N. Y., castings, $8156.47.

Allegheny Forging Co., Pittsburgh, roller rims for casting machine rolls, $1260.

Allegheny Ludlum Steel Corp., Watervliet, N. Y., steel, $2201.55.

Allen-Bradley Co., Milwaukee, drum switches, $2755.36.

Allen Mfg. Co., Hartford, Conn., screws, $5207.43.

Aluminum Seal Co., New Kensington, Pa., parts for fuzes, $15,730.

American Locomotive Co., New York, roller rims for casting machine rolls, $8550.

American Steel & Wire Co. of New Jersey, Worcester, Mass., parts for fuzes, 32216.

Ampco Metal Inc., Milwaukee, aluminum bronze centrifugal castings, $1401.39.

Ampco Twist Drill Co., Jackson, Mich., drills, $10,802.80.

Anchor Post Fence Co., Baltimore, ammunition trays, $71,214.35.

Ansonia Mfg. Co., Ansonia, Conn., drifts, $1247.04.

Armstrong-Blum Mfg. Co., Chicago, hack saws, $1794.90.

Arrow Metal Products Co., Detroit, drills, jigs and fixtures, $14,940.

Barber-Colman Co., Rockford, Ill., reamers, $1537.10.

Barnes Drill Co., Rockford, Ill., drilling machines, $5730.

Baush Machine Tool Co., Springfield, Mass., lead screw tapping machines, $3231.

Bay State Abrasive Products Co., Westboro, Mass., grinding wheels, $1111.88.

Bearing, S. B., Corp., Shreveport, La., shells, $1,976,000.

Bendix Aviation Corp., Brooklyn, N. Y., repeaters, $32,670; Eclipse Aviation Division, Bendix, N. J., miscellaneous parts, $275,538.10.

Bethlehem Steel Co., Bethlehem, Pa., steel, $52,000.

Betwinik Bros. Inc., Hamden, Conn., turret lathes, $3400.

Bickford, F. M., Co., Dayton, O., fuzes, $389,667.

Bilgram Gear & Machine Works Inc., Philadelphia, generators, $9720.

Blair Kent Aircraft Co., Camden, N. J., base supports, $10,000.

Blaw-Knox Co., Union Steel Castings Division, Pittsburgh, castings, $2050.

Bridesburg Engineering Co., Philadelphia, tools, $9545.25.

Brown-Lipe Gear Co., General Drop Forge Division, Buffalo, forgings, $35,614.

Brown Tool & Mfg. Co., Rising Sun, Ind., drills, jigs and fixtures, $1869.75.

Burroughs Adding Machine Co., Davenport, Iowa, calculating machines, $1938.60.

Carboloy Co. Inc., Detroit, tool grinders, dies, $5986.80.

Carnegie-Illinois Steel Corp., Pittsburgh, steel, $208,764.50.

Carpenter Steel Co., Reading, Pa., steel, $67,050.

Carrier Corp., Syracuse, N. Y., equipment for air conditioning systems, $3883.

Catskill Metal Works Inc., Catskills, N. Y., abrasive cutoff machines, $2475.

Christiansen, C. B., Newark, N. J., guides, holders and bushings, $2960.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, machine tools, vertical milling machines, tool and cutter grinders, $543,053.11.

Cincinnati Shaper Co., Cincinnati, traverse shaper machines, $3640.

Cleveland Automatic Machine Co., Cleveland, equipment for lathes, $1621.

Cleveland Twist Drill Co., Cleveland, reamers, $9583.75.

Collins Electric Co. Inc., Springfield, Mass., control equipment for electric motors, $1729.44.

Columbus Forge & Iron Co., Columbus, O., forgings, $1855.

Continental Motors Corp., Muskegon, Mich., fan assemblies, gears, rocker assemblies and front motor supports, $24,309.40.

Cross Gear & Machine Co., Detroit, machines, cross gear, $5090.

Crucible Steel Casting Co., Milwaukee, molybdenum castings, $1129.24.

Crucible Steel Co. of America, New York, steel, $15,784.66.

Cuyahoga Spring Co., Cleveland, springs, $9532.20.

Dana Tool-D Nast Machinery Co., Philadelphia, machinist vises, $1395.60.

Die Casters Inc., Ridgefield, N. J., castings, $9237.53.

Diehl, G. M., Machine Works Inc., Wabash, Ind., veneer jointer machines, $4745.50.

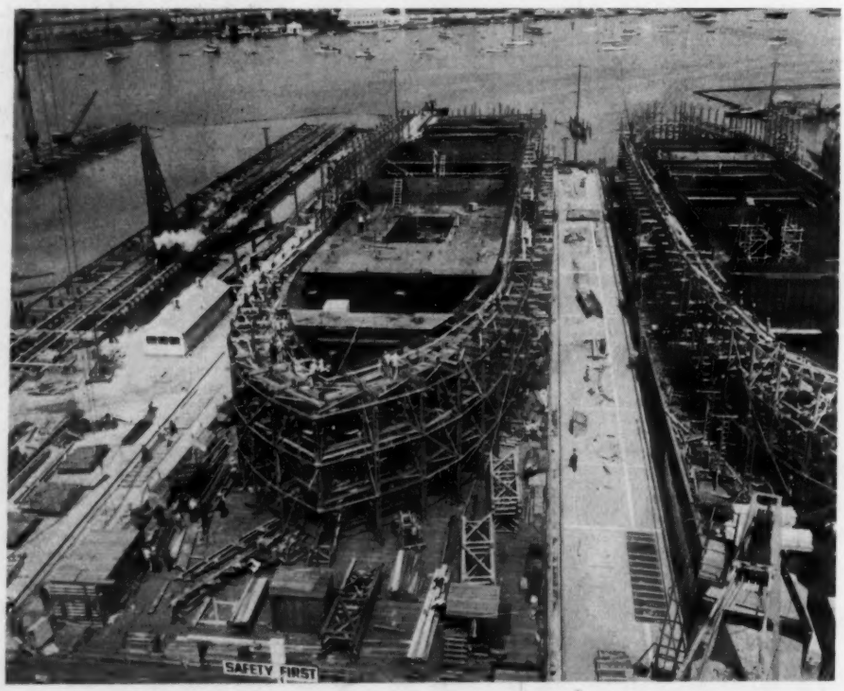
Electric Service Supplies Co., Philadelphia, vee blocks, $1110.

Essley, E. L., Machinery Co., Chicago, drill presses, and drilling and tapping machines, $23,142.98.

Federal Machinery Sales Co., Chicago, presses, $59,659.

Federal Screw Works, Detroit, latch clip

Freighters To Be Launched Weeks Ahead of Schedule



■ **Six weeks ahead of schedule is the first of fifty-five 10,500-ton freighters being built by the California Shipbuilding Corp. at Terminal Island, Los Angeles. Launching of the first vessel, for which the keel was laid May 24, was set for Dec. 15 but probably will be stepped up to about Oct. 1. Photo shows work already done on the first two vessels. NEA photo**

pins, $4342.94.
Firth-Sterling Steel Co., McKeesport, Pa., dies, $1742.50.
French, F. A., Latrobe, Pa., percussion primers, $13,250.
Gairing Tool Co., Detroit, tools, $9002.
General Electric Co., Schenectady, N. Y., motors, $4062.09.
General Engineering Co., St. Louis, shaper machines, $6388.80.
Gisholt Machine Co., Madison, Wis., turret lathes, $29,180.
Goodman Mfg. Co., Chicago, dies, $1632.
Great Lakes Steel Corp., Ecorse, Detroit, steel, $3124.02.
Greenfield Tap & Die Co., Greenfield, Mass., hand taps, $1760.62.
Hanson-Whitney Machine Co., Hartford, Conn., taps, $1028.88.
Hardinge Bros. Inc., Elmira, N. Y., milling machines, $4920.
Heidrich Tool & Die Corp., Detroit, presses, $601,207.50.
Hollup Corp., Chicago, welding electrodes, $3233.50.
Indianapolis Machinery & Supply Co. Inc., Indianapolis, turret lathes, $2260.
Jackes-Evans Mfg. Co., St. Louis, metallic belt links, $964,800.
Jessop Steel Co., Washington, Pa., steel, $1464.50.
Johnson Claflin Corp., Marlboro, Mass., gages, $2242.80.
Jones & Lamson Machine Co., Springfield, Vt., parts for lathes, $1281.
Kearney & Trecker Corp., Milwaukee, milling machines, $31,920.
Kelly, John P., Philadelphia, bronze castings, $1160.
Kempsmith Machine Co., West Allis, Wis., milling machines, $7872.76.
Krebs Mfg. & Engineering Co., Chicago, drills, jigs and fixtures, $6635.
LeBlond Machine Tool Co., Cincinnati, lathes and grinders, $204,401.
Liberty Tool & Die Corp., Rochester, N. Y., fixtures, $9595.
Lincoln Mfg. Co., Chicago, components for guns, $2251.29.
Lincoln Tool & Die Co., Detroit, drills, jigs and fixtures, $1267.
Lindberg Engineering Co., Chicago, electric furnaces, carrier arms, $19,223.54.
Machinery Mfg. Co., Los Angeles, grinders, $6500.
Madison-Kipp Corp., Madison, Wis., furnaces, $28,040.
Magnaflux Corp., Chicago, magnetizing units, $2652.
Manning, Maxwell & Moore Inc., Jersey City, N. J., drills and reamers, $2754.06.
Measuregraph Co., St. Louis, fin assemblies, $39,937.
Mereen-Johnson Machine Co., Minneapolis, band rip saws, $3433.98.
Metalweld Inc., Philadelphia, additions to pickling and washing units, $15,379.
Midvale Co., Nicetown, Philadelphia, forgings, $13,089.25.
Miles Machinery Co., Saginaw, Mich., boring, milling and drilling machines, $20,264.
Millersburg Reamer & Tool Co., Millersburg, Pa., tapered shank end mills, $2075.28.
Modern Die & Machine Co., Boston, fixtures, $3065.
Mohawk Machine & Tool Co., New York, gages, $1470.
Molded Insulation Co., Philadelphia, battery switches, $1737.50.
Motor City Tool Co. Inc., Detroit, fixtures, $3085.
National Lock Washer Co., Newark, N. J., forgings, $3478.
New Britain Machine Co., New Britain-Gridley Machine Division, New Britain, Conn., automatic screw machines, tapping attachments, $4,469,043.
New England Gas Products Inc., Charlestown, Mass., acetylene gas cylinders, $2376.
Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, Conn., gages and parts, $22,404.45.
Norton Co., Worcester, Mass., wheels, $3343.69.
Ohio Seamless Tube Co., Shelby, O., tubing, $6903.05.
Oliver Machinery Co., Grand Rapids, Mich., circular saw machines, $75,222.
Otis Steel Co., Cleveland, steel, $26,223.55.
Read Machinery Co. Inc., York, Pa., ammonium nitrate preheaters, $32,250.
Remington Arms Co. Inc., Bridgeport, Conn., lead shot, $2573.13.
Republic Steel Corp., Alloy Steel Division, Massillon, O., steel, $3761.84.
Rotary Electric Steel Co., Detroit, steel, $37,030.40.
St. Louis Steel Products Co., St. Louis, arming wire assemblies, $141,605.97.
Scovill Mfg. Co., Waterbury, Conn., baffles for fuze, $2975.
Sharon Steel Corp., Sharon, Pa., steel, $13,220.11.
Shipley, W. E., Machinery Co., Philadelphia, grinder machines, $25,532.40.
Simplex Wire & Cable Co., Cambridge, Mass., cable, $1563.
Smith & Mills Co., Cincinnati, crank shaping machines, $54,985.
Sperry Gyroscope Co., Brooklyn, N. Y., plug assemblies, $3051.72.
Springfield Machine Tool Co., Springfield, O., lathes, $10,774.
Standard Container Co. Inc., Bloomfield, N. J., packing accessories, $2,912,650.10.
Standard Pressed Steel Co., Jenkintown, Pa., screws, $4200.
Stanley Works, Stanley Tools Division, New Britain, Conn., vises, $13,773.
Stearns-Roger Mfg. Co., Denver, lathes, $830,400.
Sundstrand Machine Tool Co., Rockford, Ill., equipment for rigidmils and electromils, $9475.
Surface Combustion Corp., Toledo, O., furnaces, $78,141.
Talon Inc., Meadville, Pa., gages, $2173.50.
Taylor-Wharton Iron & Steel Co., Easton, Pa., compressed gas cylinders, $17,500.
Thompson Grinder Co., Springfield, O., broach sharpener machines, $6210.
Union Twist Drill Co., Athol, Mass., cutting hobs, drills $4618.54.
U. S. Reduction Co., East Chicago, Ind., pig lead, $7232.
Universal-Cyclops Steel Corp., Bridgeville, Pa., steel, $5142.
V & O Press Inc., Hudson, N. Y., presses, $62,000.
Waldorf Mechanical Laboratory Inc., New York, gages, $4800.
Warner Electric Brake Mfg. Co., Beloit, Wis., parts for gun carriage, $1091.97.
Weldon Tool Co., Cleveland, countersinks, $1195.20.
Wheland Co., Chattanooga, Tenn., shells, $396,000.
Wiederhold & Hubbard Inc., New York, gages, $8644.40.
Williams-White & Co., Moline, Ill., eye bending machines and tools, $7850.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $7817.10.

Corps of Engineers Awards

Allis-Chalmers Mfg. Co., Milwaukee, gasoline engines, $37,091.42.
Aluminum Cooking Utensil Co., New Kensington, Pa., steam jacketed kettles, Scott field, Illinois, $2189.
American Steel & Wire Co., Cleveland, wire, $38,088.
Ames Baldwin Wyoming Co., Parkers-

$4,192,495,000 Spent for Defense Plants

■ Cost of 2420 defense industrial plant expansions and new projects through July 31 totaled $4,192,495,000, the Bureau of Research and Statistics, OPM, estimates.

Of these, 523 were financed with public funds and account for $3,293,033,000 or 78 per cent of the total estimated cost. Privately financed projects totaled 1904, estimated to cost $899,462,000, covering 22 per cent of the total.

Plant expansions and new projects estimated to cost approximately $642,000,000 were recorded during the month of July. Of this amount the federal government made commitments totaling $572,000,000, while private financing amounted to approximately $70,000,000.

Table below presents in detail the number and estimated cost of defense industrial expansions by type of product, and by source of funds.

	TOTAL		SOURCE OF FUNDS: PUBLIC*		SOURCE OF FUNDS: PRIVATE†	
Type of Product	Number of Plant Expansions	Estimated Cost	Number of Plant Expansions	Estimated Cost	Number of Plant Expansions	Estimated Cost
		(Thousands of Dollars)				
Chemicals (including explosives)	103	$577,559	29	$515,918	73	$61,641
Products of petroleum, coal	14	31,336	2	14,334	13	17,002
Iron, steel products	349	409,815	44	241,273	306	168,542
Ammunition, shells, bombs	238	680,729	85	641,444	153	39,285
Guns	153	291,002	68	267,507	87	23,495
Aircraft	280	885,882	131	788,095	151	97,787
Ships, ship repair	126	582,737	64	562,353	62	20,384
Vehicles, tanks	64	49,996	12	30,167	52	19,829
Nonferrous metals	102	210,277	19	59,208	83	151,069
Machinery (except electrical)	508	216,672	62	100,233	446	116,439
Electrical equipment	122	35,252	19	16,965	104	18,287
Miscellaneous manufacturing	178	83,783	19	55,136	160	28,647
Nonmanufacturing	215	137,455	1	400	214	137,055
Total	2,420	$4,192,495	523	$3,293,033	1,904	$899,462

*Includes facilities estimated to cost more than $25,000 which are direct obligations of the War and Navy Departments (Including financing through Government Supply and Emergency Plant Facility Contracts), Maritime Commission, Defense Plant Corp., British government and loans of the Reconstruction Finance Corp.

†As reflected by Certificates of Necessity approved. Excludes pilot and mechanic training.

NOTE: Number of expansions shown in all total columns is an unduplicated figure.

burg, W. Va., shovels, $2140.

Aqua Systems Inc., New York, gasoline fueling system, Pope field, Ft. Bragg, North Carolina, $41,011; gasoline fueling system, Savannah, Ga., air base, $245,861.90.

Boardman Co., Oklahoma City, Okla., routabout, double drum, hydraulic cranes, aircraft assembly plant, Tulsa, Okla., $12,892.

Bruning, Charles, Co. Inc., New York, engineer drawing equipment, drafting machines, $12,741.55.

Case, J. I., Co., Racine, Wis., industrial tractors, aircraft assembly plant, Tulsa, Okla., $4108.56.

Caterpillar Tractor Co., Peoria, Ill., tractors and graders, $305,782.04.

Central Foundry Co., Bessemer, Ala., pipe and pipe fittings, MacDill field, Florida, $3396.36.

Clark, James, Jr. Electric Co., Louisville, Ky., electric drills, aircraft assembly plant, Kansas City, Kans., $3020.

Cleveland Pneumatic Tool Co., Cleveland, portable compression riveters, aircraft assembly plant, Tulsa, Okla., $24,000.

Clow, James B., & Sons, Chicago, water pipe and fittings, Scott field, Illinois, $34,870.50.

Colorado Fuel & Iron Corp., Denver, wire, $2800.

Crane Co., Omaha, Nebr., pipe and fittings, aircraft assembly plant, Ft. Crook, Nebraska, $2401.75.

Dobbie Foundry & Machine Co., Niagara Falls, N. Y., hoists, $10,494.

Egleston Bros. & Co. Inc., Long Island City, N. Y., structural steel, Mitchel field, Long Island, N. Y., $4686.

Flockhart Foundry Co., Newark, N. J., manhole frames and covers, Westover field, Chicopee Falls, Mass., $2140.

Fosdick Machine Tool Co., Cincinnati, radial drill, aircraft assembly plant, Kansas City, Kans., $9046.

Freyn Bros. Inc., Indianapolis, water-conditioning equipment, aircraft assembly plant, Kansas City, Kans., $83,800.

Frick Co. Inc., Waynesboro, Pa., ice making units, $13,035.

Fuch & Lang Mfg. Co., New York, litho plates, $5310.

General Electric Co., Schenectady, N. Y., parts for searchlight, $300,286.79.

General Motors Corp., Chevrolet Division, Detroit, trucks, Wright field, Dayton, O., $3529.46.

Hardinge Bros. Inc., Elmira, N. Y., lathes, aircraft assembly plant, Kansas City, Kans., $4704.75.

Hobart Mfg. Co., Troy, O., dishwashers, Jefferson barracks, Missouri, $14,119.95.

Hubbard & Co., Pittsburgh, hammers, bars and picks, $38,470.

Hudgins, R. W., & Son, Norfolk, Va., drills, $3513.88.

Hussman-Ligonier Co., St. Louis, refrigerators, Orlando, Fla., air base and MacDill field, Tampa, Fla., $9460.

Ingalls Shipbuilding Corp., Birmingham, Ala., welded steel barge, $19,880.

Ingersoll-Rand Co., New York, air compressors, $35,802.25.

Jackson Mfg. Co., Harrisburg, Pa., wheelbarrows, $3588.

Kelly Cash & Package Carrier Co., Chicago, pneumatic tube system, aircraft assembly plant, Kansas City, Kans., $2962.

Keuffel & Esser Co., Washington, engineer's transits, $3240.

Kilby Steel Co., Anniston, Ala., screw posts, $11,102.

Koch, Karl, Erecting Co. Inc., Bronx, N. Y., derricks and cable, $3048.75.

Lanston Monotype Machine Co., Philadelphia, process cameras, $14,755.

Lee Metal Products Co. Inc., Philipsburg, Pa., steam jacketed kettles, Jefferson barracks, Missouri, $5106.

LeTourneau, R. G., Inc., Peoria, Ill., rollers, rooters, scrapers and tractor cranes, parts for angledozer, $62,930.62.

Machine Tool & Supply Co., Tulsa, Okla., electric drills, aircraft assembly plant, Tulsa, Okla., $93,000.

Mathews Conveyer Co., Ellwood City, Pa., conveyors, $2110.20.

McKiernan-Terry Corp., New York, hammers, $5020.

McWane Cast Iron Pipe Co., Birmingham, Ala., cast iron pipe fittings, Scott Field, Ill., $2890.95.

Miller, F. W., Heating Co., Washington, boiler washing system, $7225.

Murphy Diesel Co., Milwaukee, diesel electric generating sets, $38,587.14.

National Electric Products Corp., Economy, Pa., wire, $3191.52.

Ohio Corrugated Culvert Co., Middletown, O., steam tunnel cover plates, Patterson field, Fairfield air depot, Osborn, O., $4940.80.

Onan, D. W., & Sons, Minneapolis, generators, and repair parts, $19,485.49.

O'Neall, W. Q., Co., Springfield, Ill., pipe, Scott field, Illinois, $96,068.50.

Outboard Marine & Mfg. Co., Johnson Motors Division, Waukegan, Ill., outboard motors, $4625.21.

Paulding, John I., Inc., New Bedford, Mass., sockets, keys, pendant caps, $11,040.

Paving Supply & Equipment Co., Washington, pumps, $2457.

Plumb, Fayette R., Inc., Philadelphia, hammers and sledges, $50,530.

Ransome Concrete Machinery Co., Dunellen, N. J., road pavers, $38,100.

Saltzman, J. G., Inc., New York, projectors, $3200.

Service Supply Corp., Philadelphia, derricks, $20,250.

Wallace & Tiernan Co. Inc., Belleville, N. J., purification units, $104,550.

Warwood Tool Co., Wheeling, W. Va., picks, $3200.

Woodings-Verona Tool Works, Verona,

Portable Steel-Rubber Ferries for Army

■ Mobile steel and rubber heavy bridging units like that shown here are being employed by the United States Army in war maneuvers. Base of the unit is a rubber boat, canvas-covered, and inflated for buoyancy. A "saddle" is fabricated from structural steel and forms the deck.

Photograph at top shows the "saddle" being placed in position, prior to being lashed to the boat. Below, the boat is shown loaded and ready for its trip. Depending on use and location, it is proposed to have guiding cables stretched from shore to shore, the boats to be propelled by paddles or outboard motors. NEA photos

Pa., hammers and picks, $9500.
Yale & Towne Mfg. Co., Philadelphia, chain hoists, $4464.
Youngstown Sheet & Tube Co., Youngstown, O., wire, $17,196.

Signal Corps Awards

Acorn Insulated Wire Co., Brooklyn, N. Y., wire, $1137.96.
Aircraft Accessories Corp., Kansas City, Mo., radio transmitters, $168,362.50.
American Automatic Electric Sales Co., Chicago, central office equipment, protector banks, $17,805.29.
Anaconda Wire & Cable Co., Ansonia, Conn., wire, $228,034.50.
Barco Mfg. Co., Chicago, power hammers, $1577.20.
Bates Mfg. Co., Orange, N. J., staplers and staples, $5431.68.
Bell & Howell Co., Chicago, motion picture cameras, $21,187.20.
Bendix Aviation Corp., Julien P. Friez & Sons Division, Baltimore, thermographs, $6937.50.
Bendix Radio Corp., Towson, Md., radio equipment, $2055.
Brach, L. S., Mfg. Co., Newark, N. J., jack boxes, switches, potentiometers, jacks, terminal blocks, $14,137.25.
Chicago Tool & Kit Mfg. Co., Chicago, tool sets, $57,174.
Daven Co., Newark, N. J., component parts for remote control equipment, $10,619.73.
Farnsworth Television & Radio Corp., Ft. Wayne, Ind., radio transmitters, other equipment, $390,746.
Federal Telegraph Co., Newark, N. J., transformers, mast braces, antenna assemblies, radio transmitters, other equipment, $108,136.75.
Ferris Instrument Corp., Boonton, N. J., signal generators, $2860.50.
Frioland Mfg. Co., Springfield, Mass., rotors, $2072.50.
General Dry Batteries Inc., Cleveland, batteries, $24,104.39.
Globe Sales & Mfg. Co., New York, flagstaffs, $1180.
Green, Henry T., Brooklyn, N. Y., psychrometers, $1260.
Illinois Malleable Iron Co., Chicago, axes, $8340.81.
Indiana Steel & Wire Co., Muncie, Ind., wire, $2054.85.
Kellogg Switchboard & Supply Co., Chicago, cable, switchboard, $2290.
Kenyon Transformer Co. Inc., New York, transformers and reactors, $1791.45.
Martin Hardsoeg Co., Pittsburgh, bars, $2926.40.
McElroy, T. R., Boston, keying units, practice tapes, reel assemblies, recorders, tubes, stylus, coil assemblies, $9748.
Mitchell Camera Corp., West Hollywood, Calif., motion picture cameras, $11,995.
National Carbon Co. Inc., Cleveland, batteries, $31,341.16.
Neumade Products Corp., New York, film reels, $1597.50.
Phelps Dodge Copper Products Corp., Bayway, N. J., wire, $67,365.
Philco Corp., Storage Battery Division, Philadelphia, batteries, thermometers, hydrometers, $1205.48.
Radiomarine Corp. of America, New York, radio transmitters, $47,450.
Ray-O-Vac Co., Madison, Wis., batteries, $74,231.70.
Roberts Numbering Machine Co., Brooklyn, N. Y., numbering machines, $7380.
Simplex Wire & Cable Co., Cambridge, Mass., cable assemblies and reels, $114,129.59.
Stewart-Warner Corp., Chicago, radio transmitters, $118,737.03.
Stott, Charles G., & Co. Inc., Washington, posting machines, $1797.50.
Teletype Corp., Chicago, teletypes, $3,013,947.07.
Transformer Corp. of America, New York, amplifier oscillators, $1910.84.
United States Rubber Co., New York, cable assemblies and reels, $342,827.47.
Western Electric Co. Inc., Kearny, N. J., radio receiving and transmitting components, $1,611,447.60.
White, David, Co., Milwaukee, theodolites and tripods, $2944.
Whitney Blake Co., New Haven, Conn., wire, $1243.45.
Williams, J. H., Co., Buffalo, wrench sets, $8535.03.
Wilson, W. S., Corp., New York, tool equipment, $234,030.
American Bantam Car Co., Butler, Pa., assemblies and spare parts for trucks, $6560.96.

Quartermaster Corps Awards

Amphibian Car Corp., Buffalo, ½-ton trucks, $102,000.
Behrend & Rothschild, New York, company commander whistles, $1925.
Bendix Westinghouse Automotive Air Brake Co., Elyria, O., hose couplings, $1101.70.
Blumenthal-Kahn Electric Co., Baltimore, extensions to distribution system, Ft. George G. Meade, Maryland, $13,547.45.
Boyer, Harry, Son & Co., Olympia, Wash., arena, field house, water and sewer facilities and electric service connections at 41st division cantonment area at Ft. Lewis, Washington, $63,880.
Electric Boat Co., Bayonne, N. J., stock cruisers, $88,156.
Equitable Equipment Co., New Orleans, steel cargo barges, $238,500.
Everett, Claude, Inc., Houston, Tex., water storage reservoir, 1,000,000-gallon capacity, with main and appurtenances at Camp Bowie, Texas, $52,000.
General Motors Corp., Chevrolet Division, Detroit, light 5-passenger sedan cars, 8-passenger carryall trucks, ½-ton trucks, $63,921.33.
Indian Motorcycle Co., Springfield, Mass., motorcycles, $52,166.
International Harvester Co., Ft. Wayne, Ind., dump trucks, $1,051,490.
Longwill-Scott Inc., St. Louis, coal trestle extension, Ft. Custer, Mich., $21,974
National Enameling & Stamping Co., Granite City, Ill., water containers, $186,500.
Olcott, Shirley & Nichols, Washington, truck tire chains and adjusters, $61,889.19.
Reeves Steel & Mfg. Co., Dover, O., accessories, equipment and spare parts for field ranges, $7140.
Streich, A., & Bros. Co., Oshkosh, Wis., ½-ton trailers, $8800.
Studebaker Corp., South Bend, Ind., spare parts, $942,181.68.
Twaits, Ford J., Co. and Morrison-Knudsen Co. Inc., Los Angeles, sports arena, Camp Roberts, California, $75,890.
Warner Electric Brake Mfg. Co., Beloit, Wis., cables, $1612.40.
Western Chain Products Co., Chicago, truck chains, $41,738.10.

Channel Coast Defender

■ Only the barrel of one of Britain's camouflaged guns which have engaged in cross-channel duels with German long-range rifles in France is visible in this scene showing the gun emplacement. NEA photo

Payrolls, Taxes Take 42% of 18 Billions in Sales

■ GOVERNMENT in 1940 took in taxes more than double the amount paid in dividends on common stock by 116 representative corporations and almost one-half the total paid by them in wages and salaries to employes, according to a survey by the American Federation of Investors, Chicago. Recently completed, the accompanying tabulation shows how each company's sales total, after various overhead and material costs, was split between labor, government and the common stockholder.

Taxes absorbed 13 per cent of the combined revenue from sales, and payrolls took 28.6 per cent. Common stockholders, who provided the risk capital, received in dividends less than 6 per cent of the net sales.

Combined net sales of the 116 companies in 1940 totaled $17,902,000,000 before deduction for cost of sales. Payrolls for the year aggregated $5,120,000,000, and total taxes $2,323,000,000.

Total of dividends paid common stockholders was $1,055,000,000.

Average number of employes for the 116 companies last year was 2,760,191. Common stockholders at year's end totaled 4,730 534.

Taxes Still Increasing

Labor and government, says the Federation, have ways of enforcing their demands for an increasingly large "take" out of the income of industry. This with little concern over what, if any, share of earnings may be left for the stockholder. Consequently, incentive to risk savings in new private enterprise, and thus create new jobs, is being undermined.

Tabulation of 165 representative corporations, including the accompanying 116, and published in STEEL, July 24, page 40 insert, showed taxes paid by those companies in 1940 were almost 30 per cent greater than in 1939. Earnings, however, were only 17.5 per cent greater in the latter year. Reports from many companies for the first half of 1941 indicate the ratio of taxes to earnings is still increasing steadily.

Stiff excess profits taxes, on top of the many taxes levied under previous revenue acts, are cutting deeply into earnings of many companies, especially those that have expanded to augment production of materials needed for national defense.

Net Sales of 116 Companies and Amounts Paid

(For fiscal year 1940) Name of Company	Sales*	Payroll	Total Taxes (All Kinds)	Common Dividends Paid
Air Reduction Company	$ 36,387,716	$ 8,333,277	$ 3,609,850	$ 5,423,701
Allis-Chalmers Mfg. Co.	87,096,966	28,670,004	5,160,826	2,664,027
Amer. Radiator & S. S. Corp.	93,310,702	29,147,000	5,102,000	4,017,388
American Rolling Mill Co.	112,363,529	31,945,335	4,734,425	717,159
American Steel Foundries	26,347,592	8,009,980	1,853,630	1,781,244
American Tel. & Tel. Co.	1,174,322,517●	508,344,265	187,598,702ⓔ	168,181,146⊗
American Tobacco Company	285,752,878	21,459,485	155,551,567†	22,712,411
Amer. Zinc, Lead & Smelt. Co.	14,459,949	2,852,783	420,179	None
Armstrong Cork Company	57,353,703	16,563,483▲	2,430,839	2,821,730
Atlantic Refining Company	134,169,224	24,705,306	37,568,928†	2,663,999
Atlas Powder Company	20,581,843	5,871,065	1,488,262	1,063,436
Baldwin Locomotive Works	51,102,729	19,179,687	5,309,717	None
Baltimore & Ohio R. R. Co.	179,175,465●	81,456,591	11,781,366	None
Bendix Aviation Corp.ⓓ	46,725,219	18,869,240	5,426,829	3,670,806
Bethlehem Steel Corporation	602,202,618	212,232,884	41,345,349	14,924,970
Borden Company	216,795,851	50,333,858	6,477,171	6,155,386
Bucyrus-Erie Company	19,416,244	6,019,534	1,957,700	1,225,727
Case (J. I.) Company	23,163,066	8,691,744	1,180,282	None
Caterpillar Tractor Co.	73,062,514	22,610,346	5,060,604	3,764,480
Chicago & North Western Ry. Co.	92,800,307●	49,455,570	6,599,291	None
Chrysler Corporationⓓ	744,561,239	137,728,368	53,177,345‡	23,931,226
City Ice & Fuel Company	25,688,392	8,114,000	2,013,740ⓖ	1,380,444
Columbia Gas & Elec. Corp.	109,998,017●	25,012,950	18,137,261	3,668,962
Commonwealth Edison Company	154,805,524●	39,540,530	31,404,055	22,078,960
Consol. Edison Co. of N.Y.	256,928,608●	77,923,266	58,520,682	22,942,054
Continental Can Co.	101,039,473	21,522,564	5,233,059	5,707,424
Continental Motors Corp.	10,908,460	3,402,095	408,412	None
Corn Products Refining Co.	59,523,143	10,095,517	3,332,854	7,590,000
Crane Co.	88,477,081	24,752,000	3,753,331	1,878,902
Crown Zellerbach Corp.	56,526,576	14,432,737	3,775,451ⓢ	2,261,199
Curtis Publishing Company	47,932,367	10,332,709	1,647,611	None
Detroit Edison Company	65,893,821●	15,368,128ⓒ	10,570,687ⓟ	7,619,221
Douglas Aircraft Company	60,970,774	27,126,269	4,221,757	3,000,000
Du Pont de Nemours & Co.	359,055,655	118,809,000	56,700,000	77,304,923
Food Machinery Corporation	8,739,843	3,000,000■	674,462	640,014
General Electric Company	411,938,259	153,497,000	54,943,000	53,294,446
General Mills, Inc.	125,574,139	14,318,324	2,581,978	2,078,294
General Motors Corporation	1,794,936,642	492,246,017	210,411,000	161,864,923
Illinois Central R. R. Co.	114,266,410●	54,649,364	10,053,207	None
Inland Steel Company	142,173,338	36,616,229	9,209,459	8,141,585
Interlake Iron Corporation	22,720,490	3,328,532	707,257	None
International Shoe Company	89,257,330	30,660,000	3,478,049	5,849,975
Jewel Tea Co., Inc.	29,231,608	5,964,458	1,440,170‡	1,332,044
Johns-Manville Corporation	61,761,236	20,209,093	4,642,007	2,337,500
Kelsey-Hayes Wheel Company	14,295,629ⓓ	6,945,376	1,161,945	290,285ⓣ
Kimberly-Clark Corporation	29,322,195	8,729,088	1,632,656	976,346
Kresge (S. S.) Company	158,678,509	25,442,080	8,559,691	7,411,324
Kress (S. H.) & Company	88,299,961	12,092,449	5,184,189	3,762,678
Kroger Grocery & Baking Co.	258,115,025	36,226,356	8,519,225‡	3,658,061
Lehigh Valley Coal Corp.	15,634,671	9,491,884	1,323,145	None
Libby, McNeill & Libby	58,971,538	11,765,307	1,501,130	1,813,993
Liquid Carbonic Corporation	19,123,556	6,917,897	1,089,511	700,000
Long-Bell Lumber Company	29,104,113	8,656,559	843,771	None
Louisville & Nashville R. R.	98,001,627●	46,826,442	10,304,935	7,020,000
McLellan Stores Company	24,030,780	3,908,300	602,466	439,886
Mead Corporation	24,506,440	5,440,161	956,658	154,844
Mengel Company	10,813,095	4,005,000	363,900	None
Mesta Machine Company	17,543,602	7,155,474	1,760,197	1,975,958
Middle West Corporation	66,325,825●	13,662,147	10,753,199	823,195⊗
Minneapolis-Honeywell Reg. Co.	15,933,565	4,727,093	1,561,153	1,865,700
Missouri Pacific R. R. Co.	87,124,190●	41,086,340	5,718,652	None
Mohawk Carpet Mills	17,629,878	5,500,768	1,457,559	680,000
Motor Wheel Corporationⓓ	27,843,000	5,735,618	1,718,557	1,360,000
Mullins Manufacturing Corp.	9,370,767	3,363,695	297,943	None

Firms Co-Operate When Fire Stops Defense Work

■ Six producers of abrasives have volunteered to fill approximately $1,000,000 worth of defense orders for the Exolon Co., Blasdell, N. Y., whose plant was destroyed by fire early in August, William A. Harty, president of Exolon, announced.

"Crude materials produced in Exolon's Thorold, Ont., plant are being shipped to manufacturers in Niagara Falls and New England for processing, and shipments either are made direct to the manufacturers or to our new Blasdell shipping and assembly unit for shipping to customers," he said.

"Members of the Abrasive Grain Producers Association met in Buffalo shortly after the fire and offered their facilities to us to keep a steady flow of essential defense materials moving to our customers. This was a voluntary offer made in the interest of speeding the nation's defense efforts.

"These manufacturers are buying our raw materials and we are buying back the processed materials."

Companies participating in this plan are the Carborundum Co., and General Abrasives Co., Niagara Falls; Abrasive Co., Philadelphia; American Abrasive Co., Westfield, Mass.; Washing Mills Abrasive Co., North Grafton, Mass., and Norton Co., Worcester, Mass.

Exolon is constructing an assembly and shipping plant at Blasdell to handle shipments from the cooperating manufacturers, but the company has not completed plans for reconstructing buildings destroyed by fire.

Workers, Government and Common Stockholders

(For fiscal year 1940) Name of Company	Sales*	Payroll	Total Taxes (All Kinds)	Common Dividends Paid
National Biscuit Company	$ 103,670,459	$ 31,002,559	$ 8,022,131	$ 7,543,738
National Cash Register Co.	39,922,227	20,704,604	1,959,957	1,628,000
National Dairy Products Corp.	347,410,481	68,098,000	9,984,000	5,004,198
National Gypsum Company	16,509,916	4,205,011	828,362	504,583
National Supply Co.	60,617,365	13,298,902	2,162,475	None
New York Central R. R. Co.	370,545,875•	182,973,590	34,062,837	None
Niagara Hudson Power Corp.	91,492,306•	21,700,000	17,456,950	1,437,151⊗
North American Company	130,274,856•	35,000,000■	23,640,733	10,286,814⊗
Ohio Oil Company, Inc.	59,400,517	10,228,378	10,414,000†	2,953,491
Otis Elevator Company	26,211,539	14,544,710	1,786,494	1,999,789
Owens-Illinois Glass Co.	89,297,206	26,135,632	4,203,052	5,322,408
Pacific Gas & Electric Company	109,980,302•	25,853,000	22,531,000	12,522,544⊗
Packard Motor Car Company	69,235,169	21,240,489	4,124,737‡	None
Pennsylvania Railroad Co.	477,593,408•	214,663,499	44,069,641	19,751,631
Phoenix Hosiery Company	8,856,444	4,035,000	223,866	None
Pittsburgh Screw & Bolt Corp.	10,975,771	2,168,472	723,895	674,993
Public Service Corp. of N.J.	140,327,251•	41,728,373	28,041,529	13,207,663
Pullman Incorporated	60,143,649	42,212,000	7,174,865	5,730,327
Pure Oil Company	95,675,216	18,474,208	40,289,181†	995,242
Quaker Oats Company	58,987,394	6,424,000	2,298,981	3,497,765
Radio Corporation of America	127,846,113	41,625,619	7,580,403	2,770,837
Republic Steel Corporation	303,303,447	97,570,848	16,034,921	2,268,251
Revere Copper & Brass Inc.	67,660,166	14,222,961	4,031,691	None
Ruberoid Co.	17,369,902	4,641,709	570,811	517,148
Rustless Iron & Steel Corp.	11,583,924	2,504,056	1,454,753	555,735
Sears, Roebuck & Co.	704,301,014	110,768,000	32,650,033#	24,132,712
Servel, Inc.	22,302,533	6,641,224	2,000,899†	2,226,782
Shattuck (Frank G.) Company	20,264,729	7,897,571	1,000,000■	492,830
Sheaffer (W. A.) Pen Co.	5,595,706	2,196,454	475,368	518,535
Shell Union Oil Corporation	254,103,591	54,323,000	80,502,861†	9,802,969
Silver King Coalition Mines Co.	2,013,987	843,592	190,162	488,187
Socony-Vacuum Oil Company	444,003,815	81,048,227	128,801,003†	15,603,021
Southern Calif. Edison Co. Ltd.	46,732,919•	9,300,299	9,263,372⊙©	5,568,654⊗
Spiegel, Inc.	53,477,324	6,246,100	982,641	765,395
Standard Oil Company (Ind.)	358,849,354	69,087,562	120,473,097†	22,908,007
Standard Oil Company (N.J.)	821,684,379	108,413,741▲	142,596,067‡▲	47,733,535⊗
Stewart-Warner Corporation	29,272,500	9,102,974	1,855,000	621,531
Sun Oil Company	147,672,725	36,868,059	47,352,430†	2,405,213⊙
Texas Corporation	342,810,695	57,898,051	123,008,134†	21,751,988
Texas Gulf Sulphur Company	25,582,211	1,930,000	4,112,000	9,600,000
Tide Water Associated Oil Co.	136,645,279	21,742,669⊙	35,450,776†	4,460,126
Transcont'l & Western Air Inc.	11,572,221•	4,854,042	225,518	None
Union Pacific Railroad Co.§	168,164,258•	71,485,199	15,830,851	13,337,460
United Carbon Company	8,483,357	1,317,376	1,223,332	1,193,655
United Gas Improvement Co.	118,977,217•	26,715,568	20,021,948	23,251,774⊗
United States Rubber Co.	228,988,780	64,637,000	26,004,002‡	None
United States Steel Corp.	1,145,607,886	438,621,292	85,420,545	34,813,008
Westinghouse Air Brake Co.	32,513,454	13,127,286	4,967,079	5,550,486
Westinghouse Elec. & Mfg. Co.	239,431,448	109,743,043	22,533,313	12,308,526
White Motor Company	37,573,956	8,786,000	2,011,342‡	None
Yellow Truck & Coach Mfg. Co.	97,326,308	17,481,537	7,653,804	4,274,983
Youngstown Sheet & Tube Co.	143,054,028	42,995,913	5,497,008	2,090,753
TOTAL for 116 Companies	$17,902,063,600	$5,120,406,020	$2,322,778,675	$1,054,694,414

Note: Unless otherwise indicated, the tabulation above includes consolidated figures for companies having subsidiaries. *Less returns and allowances, but before cost of sales. ⊗For parent company only. †Excise taxes included constitute more than 50 per cent of total. ‡Excise taxes included constitute between 25 and 50 per cent of total. ■Approximate. #Does not include sales tax. ▲Domestic only. §Including its leased lines. •Total operating revenues. ⊙Fiscal year changed—Bendix report for 9 months ending Sept. 30; Motor Wheel report for calendar year 1940. ⊙Does not include taxes on telephone messages paid by customers. ⊙Foreign subsidiaries not included. ⊙Does not include $2,337,801 for beer excise taxes. ⊙Includes Canadian taxes, stated in U.S. dollars, in amount of $819,691. ⊙Operating. ⊙On Class "A." ⊙Plus special stock dividend. ⊙Includes provisions in the amount of $2,501,311 for the additional taxes based on income which would have been accrued for 1940 if the company had not had the benefit for tax purposes of deductions for discount, redemption premium, and expense incident to the refunding of bonds. This amount has been applied in reduction of unamortized debt discount, redemption premium, and expense carried in the balance sheets. ⊙Domestic and foreign. ⊙For 8 months to Aug. 31.

Chain Belt Celebrates Fiftieth Anniversary

■ Chain Belt Co., Milwaukee, will celebrate the fiftieth anniversary of its founding Sept. 9. In 1891 it first produced a detachable chain, used mainly on agricultural machinery. Today it is one of the largest manufacturers of chain belts, construction machinery, elevating and conveying equipment and related products.

Chain Belt started out on an unusually small scale. While the original subscription list provided for an investment of $8500, only 3 per cent, or $255 was called and paid in at the initial meeting. Bench space was rented and a few hammers and similar small tools constituted the original equipment. The first expense account totaled $159.47. The following year the company was incorporated with an authorized capital of $21,000. Present capitalization is approximately $7,300,000. The company has plants in Milwaukee and West Milwaukee, and Springfield and Worcester, Mass.

Development of mass production methods was made possible by material handling equipment of the type manufactured by Chain Belt and prompted the expansion and improvement of products.

In 1939 under C. R. Messinger, then president of Chain Belt, the Baldwin-Duckworth Chain Corp. was merged with Chain Belt to add finished roller chain belts and automotive timing chain belts to the line. These are produced at Springfield and Worcester. On the death of Mr. Messinger in February this year, J. C. Merwin, who joined the Chain Belt organization in 1917 as superintendent, became president.

Steel Prices 1% Over 1939; Wages 16, Commodities 17

■ FROM the pre-war level of July, 1939, to mid-July, 1941, steel prices have increased an average of only 1 per cent, according to the American Iron and Steel Institute.

The 1 per cent rise in steel prices over the past two years compared with an average rise of almost 17 per cent in the United States Department of Labor's index of wholesale commodity prices during the same period, and an increase of 16 per cent in hourly earnings of steel workers.

The Labor Department's index of farm prices has risen 35.5 per cent in the past two years, as a result of which the cash obtained by a representative American farmer today from the sale of his crops can cover the cost of fully one-third more steel than was the case two years ago.

Records of steel prices in business journals show that a substantial reduction took place in the spring of 1939. A small increase which followed in November of that year left average steel prices below the levels preceding the reduction. Since April, 1941, steel prices have been "frozen" by government order.

Unchanged for 20 Months

"The composite price of finished steel products has remained unchanged at 2.26 cents per pound for the past 20 months," the institute continues. "It compares with 2.24 cents per pound in July, 1939, with 2.51 cents in 1937, and with 2.70 cents in 1923.

"In comparison with steel prices, the general average of wholesale commodity prices rose 3.1 per cent from July, 1939, to July, 1940, and in mid-July, 1941, was 16.8 per cent above the level of two years before.

"The index of farm products prices rose 6.2 per cent in the year following July, 1939, and was 36 per cent above that level in mid-July, 1941.

"While steel prices have remained virtually unchanged, the prices of many commodities consumed by the steel industry have risen sharply. The steel industry has absorbed the increased production costs resulting from higher costs of labor and raw materials, and increased taxes.

■ Mines in Alaska produced minerals worth $28,470,000 in 1940 against $25,296,000 in 1939, according to the Geological Survey. Total value of mineral output of the territory since 1880 is $831,584,000.

STEEL

Checking the Steel Stampede

■ YEARS hence when historians are able to write about the present emergency objectively, they may point to Labor day, 1941, as the approximate date on which the American defense effort began to emerge from the blissful atmosphere of glittering generalities and fanciful experiment into a sobering condition of reality.

The signs of this transition now are so positive as to be unmistakable.

As a nation we have had our fling at impossible and incongruous half-measures.

• • •

Perhaps the worst of our faults has been our unwillingness to face realities. We have talked big of what we are going to do. Our minds have been so diverted by the remote vistas of time and distance that we have devoted too little attention to affairs at home and of the moment.

Now our dreams are shattered. At last we are down to the brass tacks problems of what we are doing today and right here at home, under our own noses.

Looking at past events through the nonflattering lenses of cold reality we can see what fools we have been.

For a whole year Bernard Baruch, from his rich experience of 1918, has been counseling us to adopt formal priorities and to freeze prices.

We ignored him. We experimented with informal priorities and a crazy-quilt of arbitrary price "ceilings." We talked hysterically about shortages, scarcities, runaway prices, etc. We conceived fantastic schemes for impractical expansions of productive capacity.

Looking back we can now see the dismal effect of these follies. We practically invited everybody to stock up on goods in which metals predominate.

Like the loose talker whose careless words start a run on a sound bank, we in our hysteria incited a run on the nation's metal producing resources.

We encouraged everybody to ask for his present and future needs at once. Our navy and our army contracted for some items in quantities that cannot be consumed in five years.

We encouraged the public to anticipate its needs in automobiles, refrigerators, etc. Unconsciously we put a sudden artificial—and to a large extent unnecessary—burden upon industry.

As a result shortages developed. We grew more hysterical. Belatedly we told the people they must cut down in their demands. Cruelly we told some businesses that they are doomed, that they must shut down and that their employes must seek jobs elsewhere.

• • •

These brutal words are bringing us to our senses. After dissipating our unprecedentedly high industrial output for a year or more—after precipitating a ruinous run on our bank of production—we at long last are going to channel our output into consumption where it will be most effective.

In due time we will discover that our capacity is more nearly adequate than we realize. Then, with industrial white elephants all around us, we will blush at our one-time hysteria for excessive plant capacity.

E. C. Shaner

EDITOR-IN-CHIEF

Sept. 8, 1941

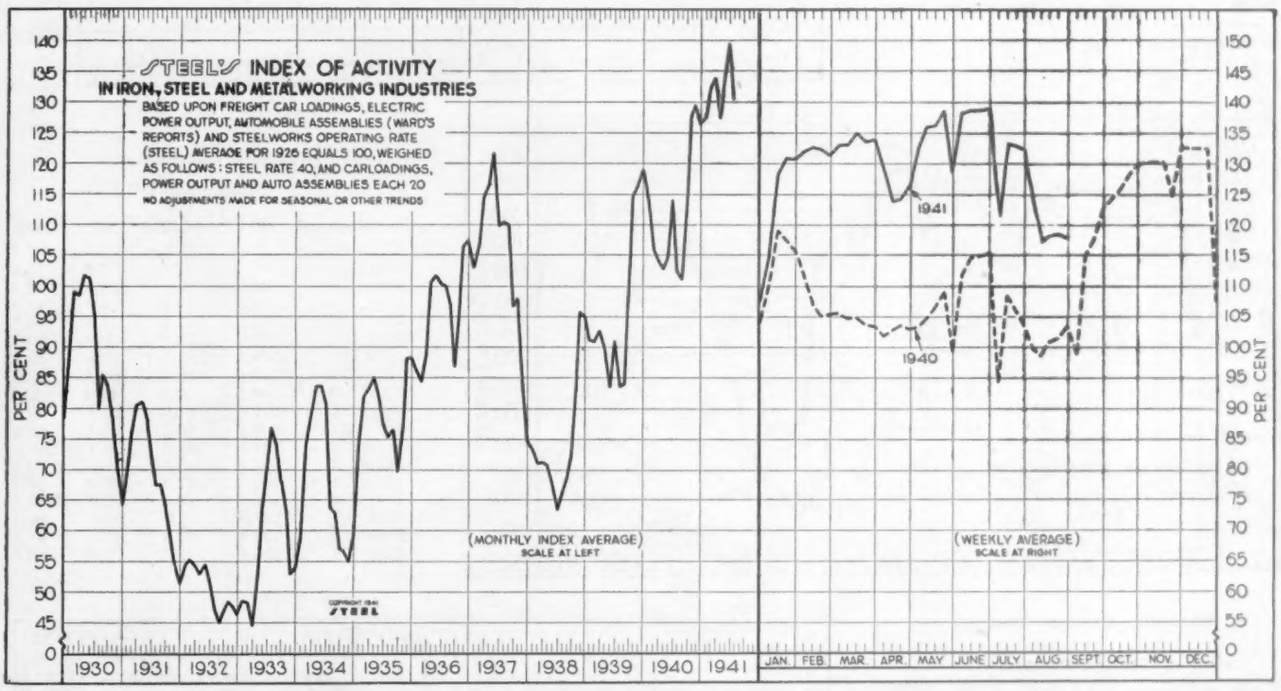
The *BUSINESS TREND*

Underlying Industrial Trend Continues Upward

■ THE defense program is exerting a steadily broadening influence upon the industrial economy. It is by far the most outstanding motivating force in the business picture and is expected to become an even more dominating factor over the months to come.

Activity in the nondefense lines is slowing down as shortages of raw materials develop and government priorities and controls become more widespread. Changeover from civilian to defense production is also a retarding influence at the moment. However, the underlying trend of industrial production is upward and should reach a new peak late this year.

STEEL'S index of activity stood at 118.1 in the week ended Aug. 30, compared with the revised figure of 118.5 for the preceding week and 103.5 in the comparable week a year ago. The national steel rate on a weekly basis has been revised since the period ended July 5 last, to more closely conform with the new ingot capacity figure as of June 30, recently reported by the American Iron and Steel Institute. To reflect these revisions in the weekly steel rate figures, STEEL'S activity index was adjusted accordingly.

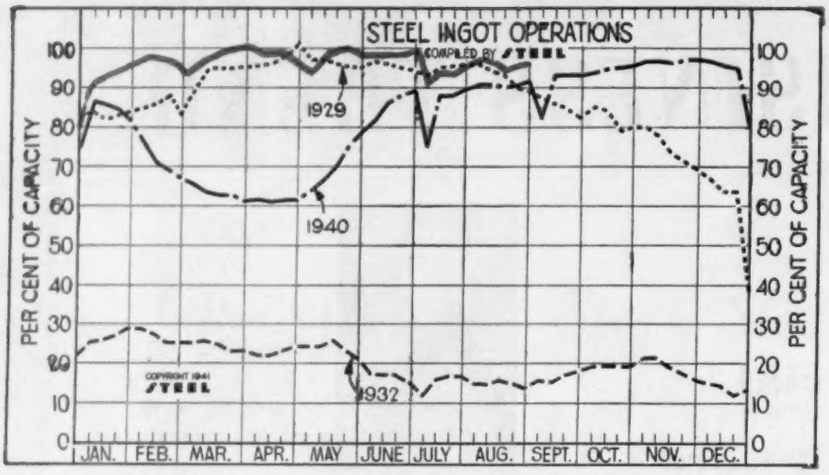

STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
(MONTHLY INDEX AVERAGE) SCALE AT LEFT
(WEEKLY AVERAGE) SCALE AT RIGHT
1941
1940
1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

STEEL'S index of activity declined 0.4 point to 118.1 in the week ended Aug. 30:

Week Ended	1941	1940
June 21	138.7	114.8
June 28	138.8	115.3
July 5	120.9	94.2
July 12	133.4	108.5
July 19	133.2	106.0
July 26	132.9	103.4
Aug. 2	123.3	99.7
Aug. 9	117.5	98.4
Aug. 16	118.2	100.8
Aug. 23	118.5	101.4
Aug. 30	118.1†	103.5

†Preliminary.

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	131.2	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3



Steel Ingot Operations

(Per Cent)

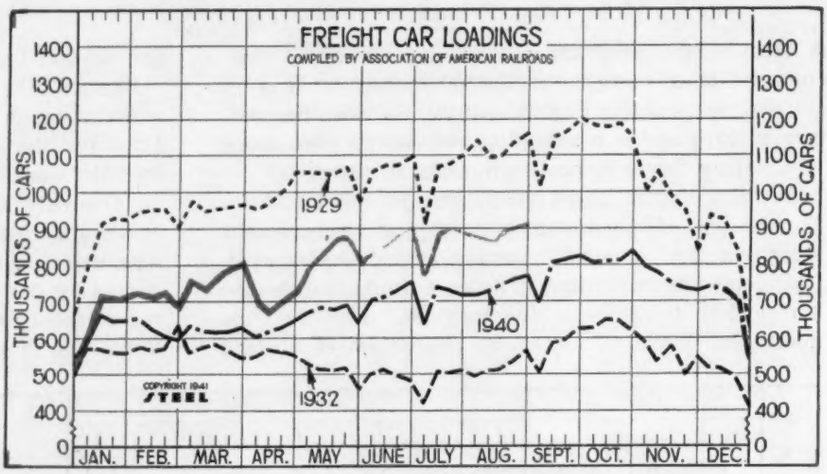
Week ended	1941	1940	1939	1938
Aug. 30....	96.5	91.5	64.0	44.5
Aug. 23....	96.0	90.5	63.5	43.5
Aug. 16....	95.5	90.0	63.5	41.5
Aug. 9....	96.5	90.5	62.0	40.0
Aug. 2....	97.5	90.5	60.0	40.0
July 26....	96.0	89.5	60.0	37.0
July 19....	95.0	88.0	56.5	36.0
July 12....	95.0	88.0	50.5	32.0
July 5....	92.0	75.0	42.0	24.0
June 28....	99.5	89.0	54.0	28.0
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5
May 24....	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0

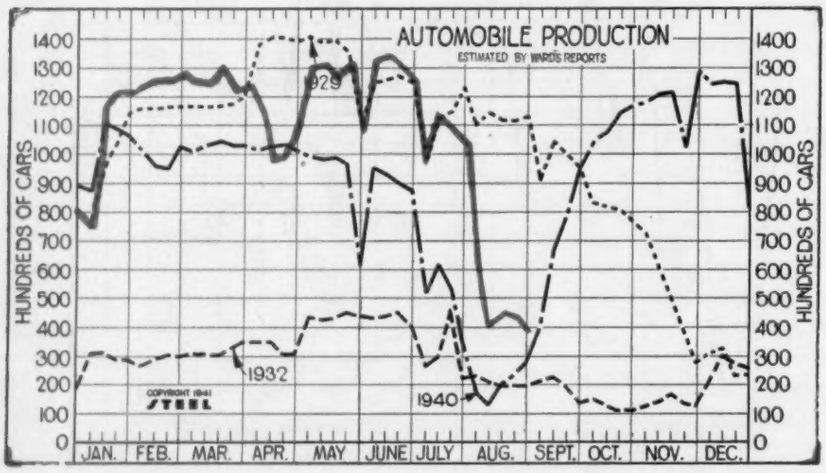
Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
Aug. 30.....	910†	769	722	648
Aug. 23.....	900	761	689	621
Aug. 16.....	890	743	674	598
Aug. 9.....	879	727	665	590
Aug. 2.....	883	718	661	584
July 26.....	897	718	660	589
July 19.....	899	730	656	581
July 12.....	876	740	674	602
July 5.....	740	636	559	501
June 28.....	909	752	666	589
June 21.....	886	728	643	559
June 14.....	863	712	638	556
June 7.....	853	703	685	554
May 31.....	802	639	568	503
May 24.....	886	687	628	562
May 17.....	864	679	616	546

†Preliminary.





Auto Production

(1000 Units)

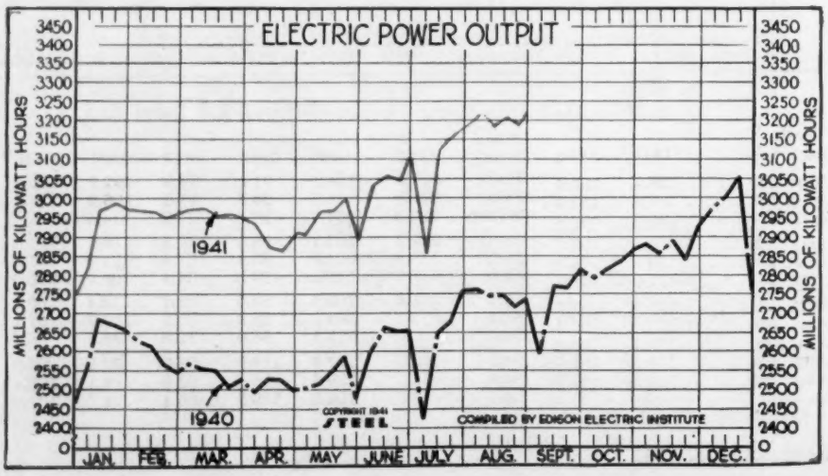
Week ended	1941	1940	1939	1938
Aug. 30....	40.0	27.6	25.2	22.2
Aug. 23....	45.5	23.7	17.5	18.7
Aug. 16....	45.6	20.5	13.0	23.9
Aug. 9....	41.8	12.6	24.9	13.8
Aug. 2....	62.1	17.4	28.3	14.8
July 26....	105.6	34.8	40.6	30.4
July 19....	109.9	53.0	47.4	32.1
July 12....	114.3	65.2	61.6	42.0
July 5....	96.5	52.0	42.8	25.4
June 28....	127.9	87.6	70.7	40.9
June 21....	133.6	90.1	81.1	40.9
June 14....	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3....	130.6	99.3	71.4	53.4

Electric Power Output †

(Million KWH)

Week ended	1941	1940	1939	1938
Aug. 30.....	3,224	2,736	2,442	2,217
Aug. 23.....	2,193	2,714	2,434	2,202
Aug. 16.....	3,201	2,746	2,454	2,207
Aug. 9.....	3,196	2,745	2,414	2,198
Aug. 2.....	3,226	2,762	2,400	2,194
July 26.....	3,184	2,761	2,427	2,160
July 19.....	3,163	2,681	2,295	2,085
July 12.....	3,141	2,652	2,403	2,154
July 5.....	2,870	2,425	2,145	1,937
June 28.....	3,121	2,660	2,896	2,074
June 21.....	3,056	2,654	2,362	2,082
June 14.....	3,057	2,665	2,341	2,051
June 7.....	3,042	2,599	2,329	2,057
May 31.....	2,924	2,478	2,186	1,937

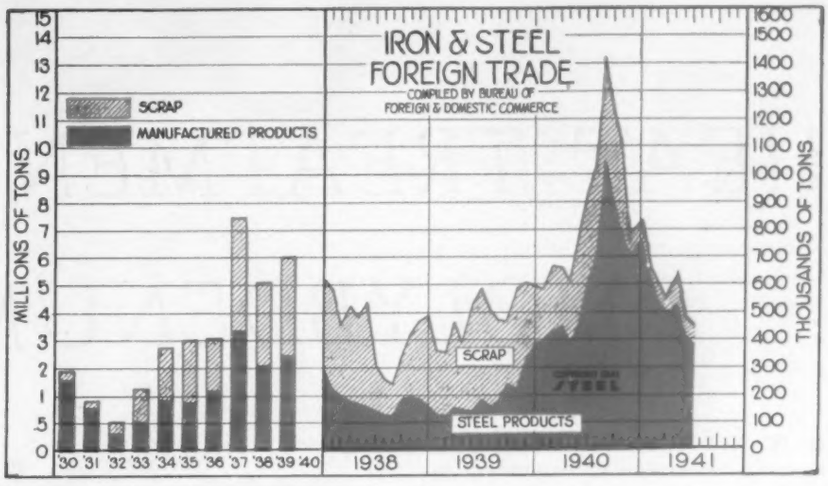
†New series: Includes additional governmental and power generation not previously reported.

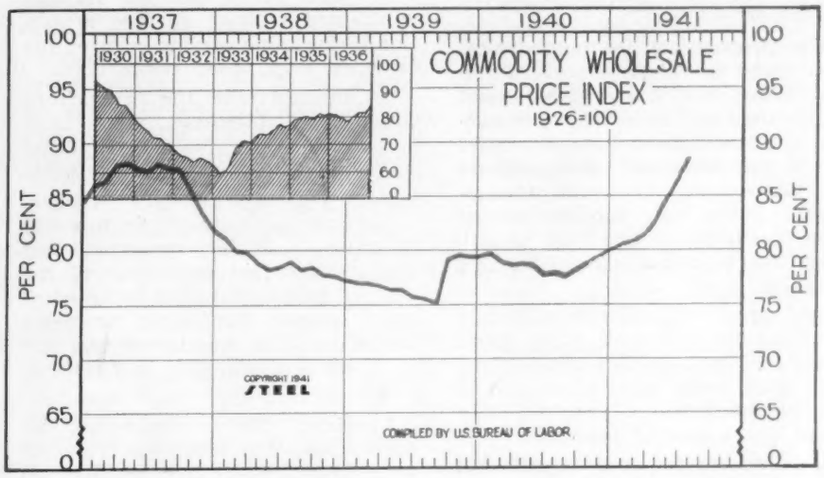

ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
1940
COPYRIGHT 1941 STEEL
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Iron and Steel Exports

(Thousands of Gross Tons)

	Steel Products		—Scrap—		Total
	1941	1940	1941	1940	1941
Jan.	653.8	396.1	45.1	187.5	698.9
Feb.	525.9	436.6	74.4	234.7	600.2
Mar.	512.8	457.1	54.4	206.9	567.2
April	515.7	391.8	120.2	221.2	635.8
May	409.8	471.5	62.9	312.5	472.7
June	398.7	617.7	59.0	318.4	457.7
July	.....	707.8	.....	327.1	.....
Aug.	.....	1046.1	.....	346.1	.....
Sept.	.....	965.4	.....	251.1	.....
Oct.	.....	846.6	.....	258.5	.....
Nov.	.....	713.8	.....	74.3	.....
Dec.	.....	735.2	.....	70.0	.....
Total	.....	7,785.5	.....	2,823.1	.....





All Commodity Wholesale Price Index U. S. Bureau of Labor

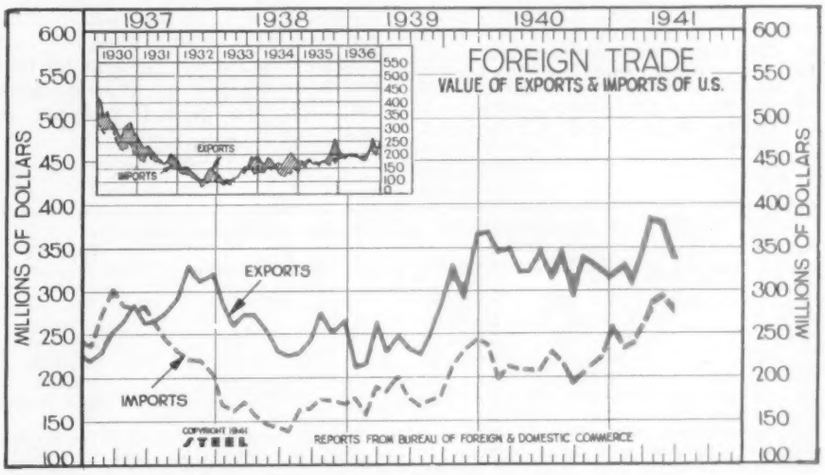
(1926 = 100)

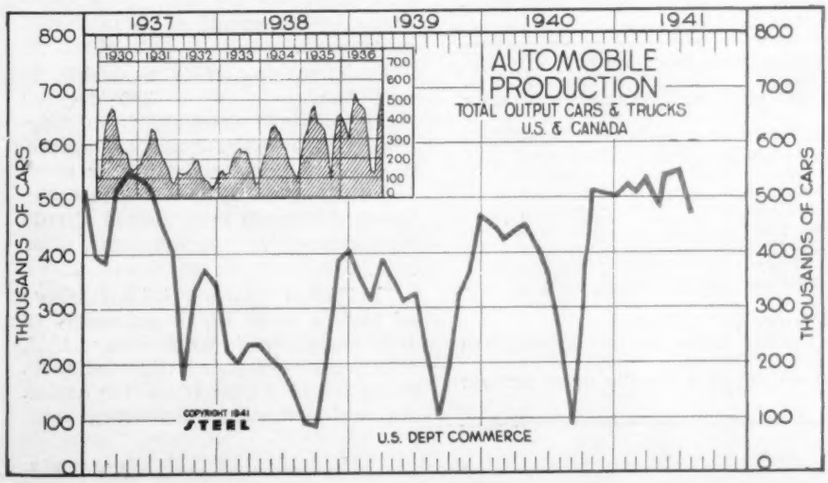
	1941	1940	1939	1938	1937
Jan.	80.8	79.4	76.9	80.9	85.9
Feb.	80.6	78.7	76.9	79.8	86.3
March	81.5	78.4	76.7	79.7	87.8
April	83.2	78.6	76.2	78.7	88.0
May	84.9	78.4	76.2	78.1	87.4
June	87.1	77.5	75.6	78.3	87.2
July	88.8	77.7	75.4	78.8	87.9
Aug.	....	77.4	75.0	78.1	87.5
Sept.	....	78.0	79.1	78.3	87.4
Oct.	....	78.7	79.4	77.6	85.4
Nov.	....	79.6	79.2	77.5	83.3
Dec.	....	80.0	79.2	77.0	81.7
Ave.	....	78.5	77.1	78.6	86.3

United States Foreign Trade

(Unit: $1,000,000)

	Exports		Imports	
	1941	1940	1941	1940
Jan.	$325.4	$368.6	$228.7	$241.9
Feb.	303.4	347.0	233.7	199.8
Mar.	357.6	352.3	267.8	216.7
April	385.5	324.0	287.6	212.2
May	384.6	325.3	296.9	211.5
June	337.7	350.2	279.5	211.4
July	.....	317.0	.....	232.3
Aug.	.....	349.9	.....	220.5
Sept.	.....	295.2	.....	194.9
Oct.	.....	343.5	.....	207.1
Nov.	.....	327.7	.....	223.4
Dec.	.....	322.3	.....	253.1
Total	.....	$4,021.6	.....	$2,625.4





Automobile Production

(Unit: 1000 Cars)

	1941	1940	1939	1938	1937
Jan.	524.1	449.3	357.0	227.1	399.2
Feb.	509.3	421.8	317.5	202.6	383.8
March	533.9	440.2	389.5	238.6	519.0
April	489.8	452.4	354.3	238.1	553.4
May	545.3	412.5	313.2	210.2	540.4
June	546.3	362.6	324.2	189.4	521.1
July	468.8	246.2	218.5	150.4	456.9
Aug.	.....	89.9	103.3	96.9	405.1
Sept.	.....	284.6	192.7	89.6	175.6
Oct.	.....	514.4	323.0	215.3	338.0
Nov.	.....	511.0	370.2	390.4	376.6
Dec.	.....	506.9	469.0	407.0	346.9
Ave.	.....	391.0	311.0	221.3	418.0

HEAT TREATMENT OF MOLYBDENUM HIGH SPEE

■ IT SHOULD be borne in mind that where hardening equipment is available in which decarburization can be controlled, there is no particular problem involved in replacing the tungsten high speed steel with the proper molybdenum high speed steel. There are differences in hardening temperatures and timing cycles but the broad general principles are similar.

Where proper equipment does not exist, the special precautions indicated below should be helpful.

High speed steel is defined by the OPM as follows:

"The term "high-speed steel" as herein used is defined as including two classes of alloy steels:

(i) "Class A high-speed steel" is hereby defined as either alloy steel containing not less than 0.60 per cent carbon and containing more than 3.0 per cent molybdenum; or alloy steel containing not less than 0.60 per cent carbon, containing 7.0 per cent or less tungsten, and containing more than 3.0 per cent molybdenum.

(ii) "Class B high-speed steel" is hereby defined as alloy steel containing not less than 0.55 per cent carbon and containing more than 12.0 per cent tungsten.

NOTE: Other alloy materials may be present in the steels of either class, but steel not containing the substances named, in the amounts specified, shall not be considered high-speed steel."

The compositions for molybdenum high speed steels as given in Table I, include only those steels most widely used and established for general commercial tool applications. There are additional compositions which are used for special applications. Since they require special heat treatment to properly handle, their use is not discussed in this practice.

For those who are not skilled in handling molybdenum high speed steels and who do not have decarburization under good control, it is recommended that at present they adopt the following procedure:

(1) Use the required substitution of molybdenum high speed steels, selecting the type that will produce the best results and give the least trouble in working. The smaller tools are heat treated by shorter cycles and thus the general hazards are less.

(2) Proceed on the basis that steels of Type III decarburize less than steels of Type I or II. In most cases steels of Type III can be treated without surface protection in the same equipment used for tungsten high speed steels.

(3) Consult with the firms from whom you purchase your high speed steels for their best advice in the light of your particular problem.

(4) Take steps to obtain modern, efficient hardening equipment on the premise that regardless of the kind of high speed steel being hardened, proper hardening promotes better tool life and better tool life in itself is a big step in conservation.

Forging: These steels can be forged like the tungsten type but at a slightly lower temperature, see Table II. When heating the molybdenum high speed steels for forging they should be held in the furnace for the shortest time possible at the forging temperature.

Like all types of high speed steel, large pieces should be preheated to 1000-1200 degrees Fahr. before heating to the forging temperature.

Slightly oxidizing atmospheres are preferred when no protective coating is used. No protection is necessary for ordinary sized forgings unless long heating cycles are involved. Borax is a very effective coating but has the disadvantage of making the surface of the steel very slippery at the forging temperature so the operator should take due precautions. To minimize the fluxing action on the furnace refractories, an excess of borax should be avoided.

After forging it is desirable to cool slowly to about 300 degrees Fahr. to avoid cracking from forging strains. This can be accomplished by furnace cooling or burying in lime, mica, or dry ashes, etc. Tools that have been forged should be machined or rough ground, after

Table I—Compositions for Molybdenum High Speed Steels

	Type I Molybdenum-Tungsten a	Type I Molybdenum-Tungsten b*	Type II Molybdenum-Vanadium	Type III Tungsten-Molybdenum
C	.70- .85	.76- .82	.70- .90	.75- .90
W	1.25-2.00	1.60-2.30	.....	5.00-6.00
Cr	3.00-5.00	3.70-4.20	3.00-5.00	3.50-5.00
V	.90-1.50	1.05-1.35	1.50-2.25	1.25-1.75
Mo	8.00-9.50	8.00-9.00	7.50-9.50	3.50-5.50
Co	See footnote	4.50-5.50	See footnote	See footnote

*Cobalt may be used in any of these steels in varying amounts up to 9.00 per cent and the vanadium may be as high as 2.25 per cent. When cobalt is used in Type III, this steel becomes susceptible to decarburization. As an illustration of the use of cobalt, Type Ib is included. This is steel T10 in the U. S. Navy Specification 46S37, dated November 1, 1939.

Table II*—Heat Treatment of Molybdenum High Speed Steels

	Type I Molybdenum-Tungsten a and b (deg. Fahr.)	Type II Molybdenum-Vanadium (deg. Fahr.)	Type III Tungsten-Molybdenum (deg. Fahr.)
Forging	1850-2000	1850-2000	1900-2050
Not below	1600	1600	1600
Annealing	1450-1550	1450-1550	1450-1550
Strain Relief	1150-1350	1150-1350	1150-1350
Preheating	1250-1500	1250-1500	1250-1550
Hardening‡	2150-2250†	2150-2250	2175-2275
Salt	2150-2225	2150-2225	2150-2250
Tempering	950-1100	950-1100	950-1100

*Hardening curves of the various types are appended.

†Under similar conditions Type b requires a slightly higher hardening heat than Type a.

‡The higher side of the hardening range should be used for the large sections and the lower side for the small sections.

Prepared by a special committee of the O. P. M. The personnel of this committee is as follows: N. I. Stotz, chairman, J. H. McCadie, W. H. Wills, F. Lloyd Woodside and J. Edward Donnellan, secretary.

EED STEELS*

annealing, to remove possible surface defects and to reduce the amount of grinding after hardening.

Annealing: Like tungsten high speed steels, these steels should be annealed after forging and before hardening, or when rehardening is required. Box annealing is always preferable. When annealing partially finished tools, and generally when surface protection is of prime importance, it is recommended that cast iron chips or other mild source of carbon be used for packing material.

Heat slowly and uniformly to the temperature given in Table II, soak thoroughly and then cool slowly in the furnace. The steel should not be taken from the furnace until it is below 1000 degrees Fahr.

After machining and before hardening it may be necessary to relieve harmful machining strains by annealing at 1150-1350 degrees Fahr.

Hardening: The general method of hardening molybdenum high speed steels resembles that followed with 18-4-1, but the hardening temperatures (Table II) are lower and more precautions must be taken to avoid decarburization especially on tools when made from Type I or II when the surface is not ground after hardening. Salt baths and atmosphere controlled furnaces represent an excellent type of equipment for hardening molybdenum high speed steel. The use of coke fires or the blacksmith forge is not recommended for hardening any high speed steel, but if this type of equipment is all that is available, Type III may be so treated if an excess of air is avoided. However, simple surface protection in such equipment is safer practice even in the case of tungsten high speed steels.

The usual method is to preheat uniformly in a separate furnace to 1250-1550 degrees Fahr. and transfer to a high heat furnace maintained at the hardening temperature, (see Table II).

When heated in open fire or in furnaces without atmosphere control, these steels do not sweat like 18-4-1. Consequently, the proper time in the high heat chamber is a matter of experience. This time approximates that used with 18-4-1 although slightly longer when the lower part of the hardening range is used. Much can be learned by hardening preliminary test pieces and checking up on the hardness fracture and structure. It is difficult to state exact heating time as this is affected by temperature, type of furnace, size and shape, and furnace atmosphere.

Rate of heat transfer is most rapid in salt baths, and slowest in controlled atmosphere furnaces with high carbon monoxide content.

Quenching: Quench the tool in oil, air, or molten bath. To reduce the possibility of breakage and undue distortion in intricately shaped tools, it is advisable to quench in a molten bath at approximately 1100 degrees Fahr. The tool may be quenched in oil and removed while still red or at approximately 1100 degrees Fahr. The tool is then cooled in air to room temperature and tempered immediately to avoid cracking.

Straightening: When straightening is necessary, it should be done after quenching and before cooling to room temperature prior to tempering.

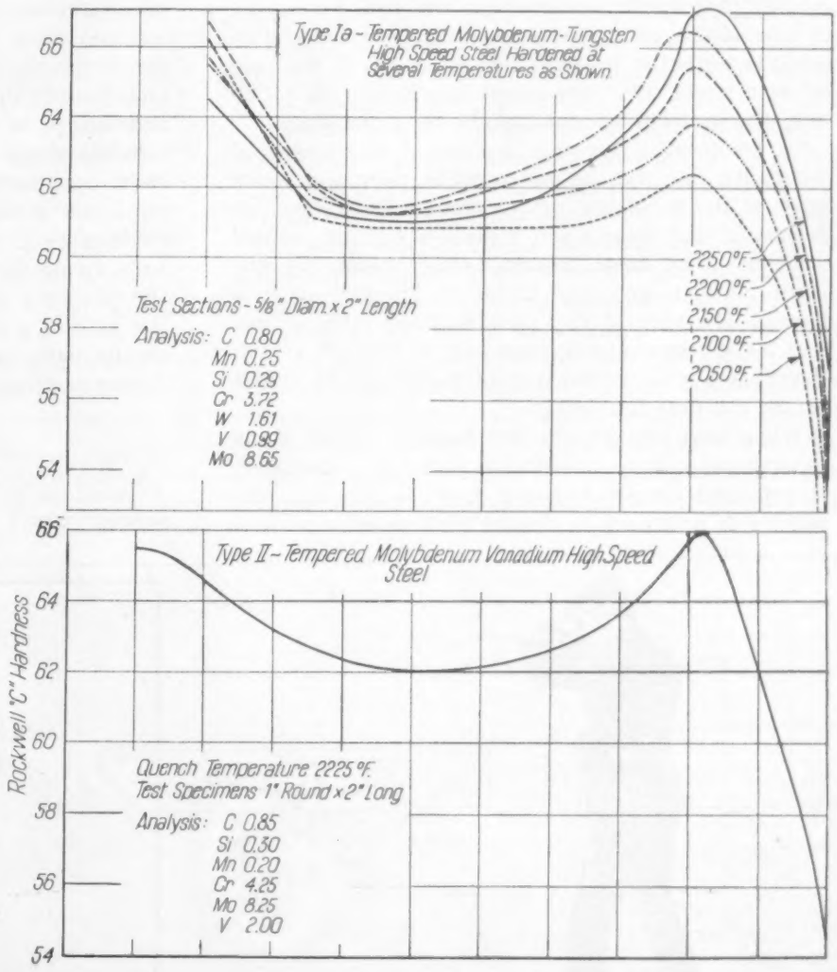
Tempering: Reheat slowly and uniformly to 950-1100 degrees Fahr. For general work 1050 degrees Fahr. is most common. Hold temperature at least one hour. Two hours is a better safe minimum and four hours is maximum. The time and temperature depend on the hardness and toughness required. Where tools are subjected to more or less shock, multiple temperings are suggested.

Salt Baths: See attached report from OPM Salt Bath Committee.

Furnaces: See attached report from OPM Furnace Committee.

Coatings: Borax may be applied by lightly sprinkling over the steel when heated to a low tempera-

(*Please turn to Page 73*)



Instruments for Fire Control . . . .

THE RANGEFIND

Except for occasional point-blank fire, every heavy gun, whether on land or sea, must be accompanied by correct auxiliary equipment for controlling its fire—properly aiming the gun and setting the shell fuze. In this first of a series on fire-control systems and instruments, Professor Macconochie explains methods for approximate mechanical solution of the problem of relative motion of ships and moving targets; the precision solution of the problem of prediction; tachometers; prediction in three dimensions; the development and construction of the short-base rangefinder

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

This Is Number 28 in a Series on Ordnance and Its Manufacture, Prepared for STEEL *by Professor Macconochie.*

■ AS CAPITAL ships go down under gun fire in the ancient waters of the Atlantic and the Mediterranean sea, and cities of Europe and Asia crumble under air attack, it would seem appropriate to follow the account of shell and gun manufacturer already presented with a few references to methods for so controlling gun fire that the shell will find its target. As everyone knows, the moment the shell leaves the muzzle of the gun, gravity exerts a force tending to pull the projectile to earth. If, for example, the barrel of a naval rifle were aimed in a horizontal direction, the projectile would quickly enter the sea.

To compensate for this downward component of the shell's velocity, the gun must be pointed at some angle to the horizontal or "elevated." Before we can determine just how much elevation the gun should have, we must know, amongst other things, the distance between gun and target or "range" as it is termed. Further if the shell is fitted with a time fuze, as it frequently is, especially in aircraft attack, the range and hence the time of flight must be known before the fuze can be set.

When Gun and Target Are Moving: While a stationary gun may be called upon to fire at a stationary target, both target and gun may be moving, thus making it necessary to predict their relative position after the lapse of the interval during which the shell is in the air. In what follows it may be convenient to remember that we can more easily visualize the relative velocity of the two bodies if we impress upon both the velocity of the body of reference reversed. This brings the latter to rest without affecting the relative velocity of the two bodies. In Figure A, *ab* represents the velocity of the attacking ship (let us assume) while *cd* is drawn to indicate the velocity of the target (a vector diagram in which the direction and speed of the vessels are indicated by the direction and length of the lines or vectors). The relative velocity of the two ships is obtained by applying the above rule in the construction of the triangle *aef*, in which *ae* is the velocity of A reversed and *ef* is the velocity of C (the target). Then *af* is the relative velocity of the two ships and if it be assumed for the purposes of naval gunnery that any portion of the path of a naval vessel coincides with the tangent to the path, we are in a position to determine the future position of the enemy.

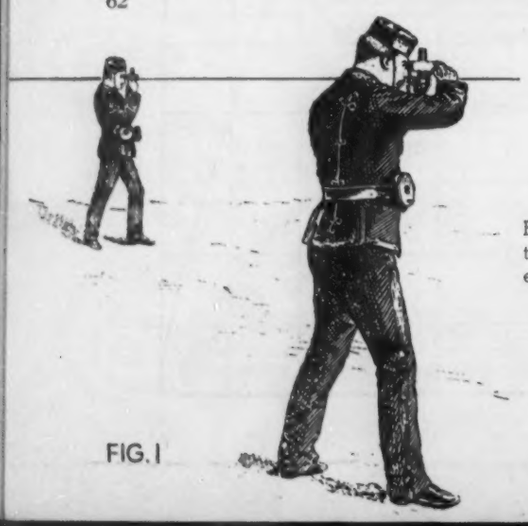
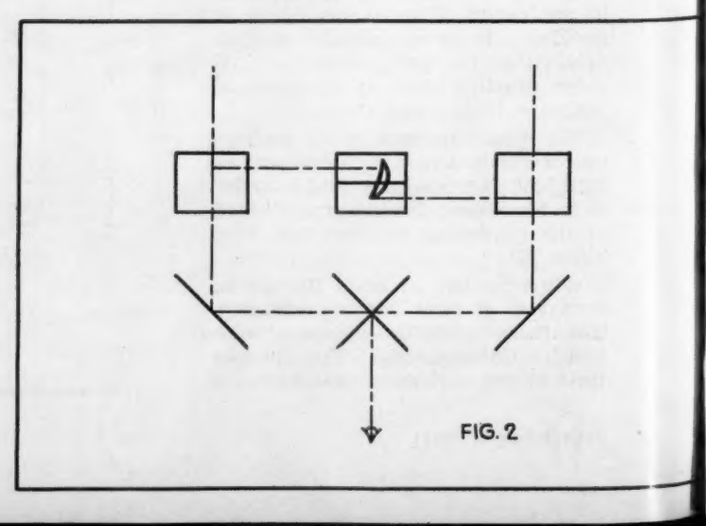


Fig. 1—Two observers taking a range with an early type of rangefinder

Fig. 2—Clark rangefinder directed toward object at great distance, the new moon, showing halves of the two fields in coincidence. The two images split horizontally but the halves coincide



NDER

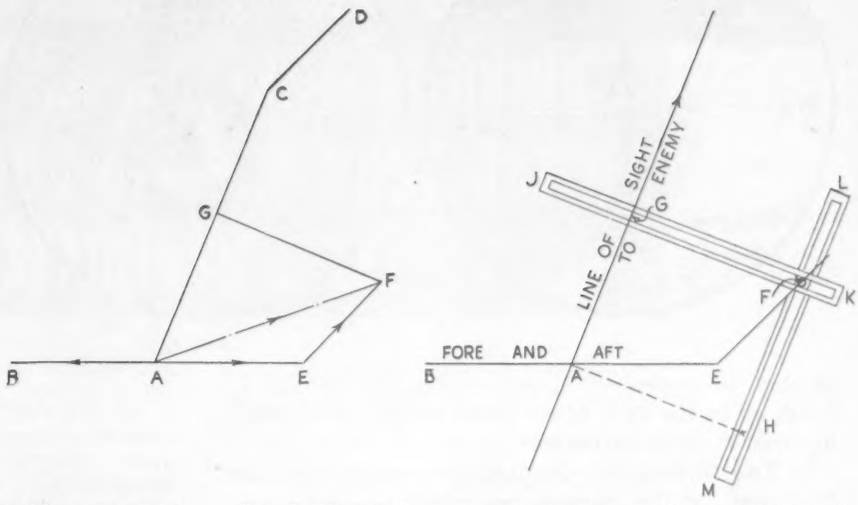


Fig. A—At left, is vector diagram for predicting position of a moving target with respect to a moving gun (both battleships). At right, Fig. B, is a diagram of a setup for solving this vector problem mechanically

In the approximate solution of this problem we may deal in terms of the following quantities:—

(1) The observed line of sight between A and C
(2) The known speed of A
(3) The estimated speed of the target C and
(4) The estimated course of the target relative to A.

Mechanical Device Solves Problem Instantly: The elements of a mechanical device designed to transmit a continuous record of a moving target and operating on the above bases, would embody a sighting device of the alidade type, let us say, to give us the direction of the vector *ac*. The instrument would preferably be set up in some position such as the control top, where an all-round view could be obtained. Velocity vector *ae* would be set by reference to the fore and aft direction of the ship and to the known speed, the latter alone being subject to change. At *e*, a pivoted bar carrying a sliding pin would be provided, so that the estimated course of the enemy in magnitude and direction could be set out; and upon this pin might be mounted two slotted sliding bars parallel to *gf* and *ga* respectively, capable of rotation as a whole about *a* as the vector *ac* rotates, and free to move individually in rectilineal fashion along and at right angles to the line of sight respectively. The diagrammatic outline of this instrument is shown in Fig. B.

It will be obvious that the normal distances of the bars JK and LM from *a* give us a measure of the rate of change of range and the rate of change of bearing or deflection; and further that it would only be necessary to utilize their motion to drive the commutators of transmitters (such as the selsyn type) by means of racks and pinions in order to transmit this information to any desired point. An instrument embodying these characteristics was originally produced in Glasgow, Scotland, by Barr & Stroud and was known as the "Rocord."

Prediction: A precise solution of the problem of prediction requires the measurement of *ag* and *gf* directly, a task which can only be accomplished when some accurate and continuous method of determining the range of the enemy is available. Suppose, for instance, that the mechanical element in the rangefinder were connected to a tachometer or other device capable of measuring its velocity. Then there would be no need to estimate the course and speed of the target. The rate of change of range would be known and the deflection could similarly be found from the movement of a sighting device in azimuth. Prediction thereafter would consist in the multiplication of these rates by the corrected time of flight. When to the

Fig. 3—Clark rangefinder directed at near object, flag and mast, to show displacement between halves of the horizontally split fields. This displacement was measured and calibrated to give range

Fig. 4—The Adie rangefinder of 1860, another early design

Fig. 5—The end pentagonal. Even with some movement, the entering and leaving rays of light will be precisely 90 degrees apart. This is important as use of such a unit eliminates variations caused by movement of mountings

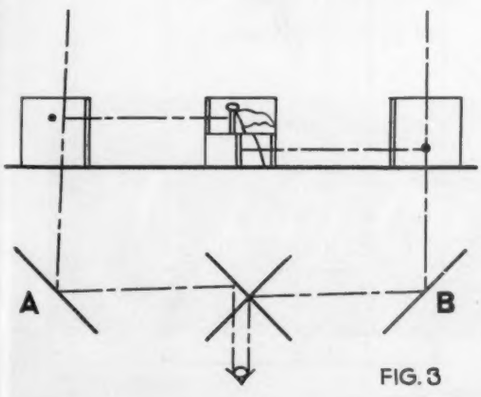


FIG. 3

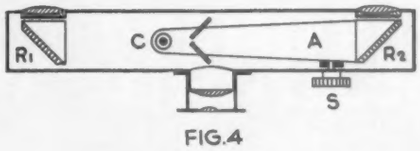


FIG. 4

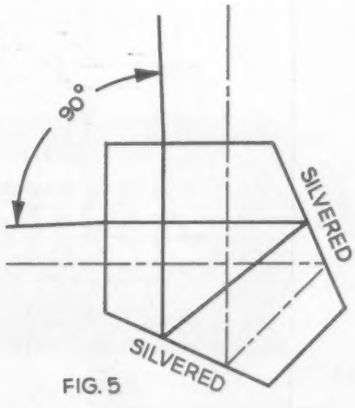


FIG. 5

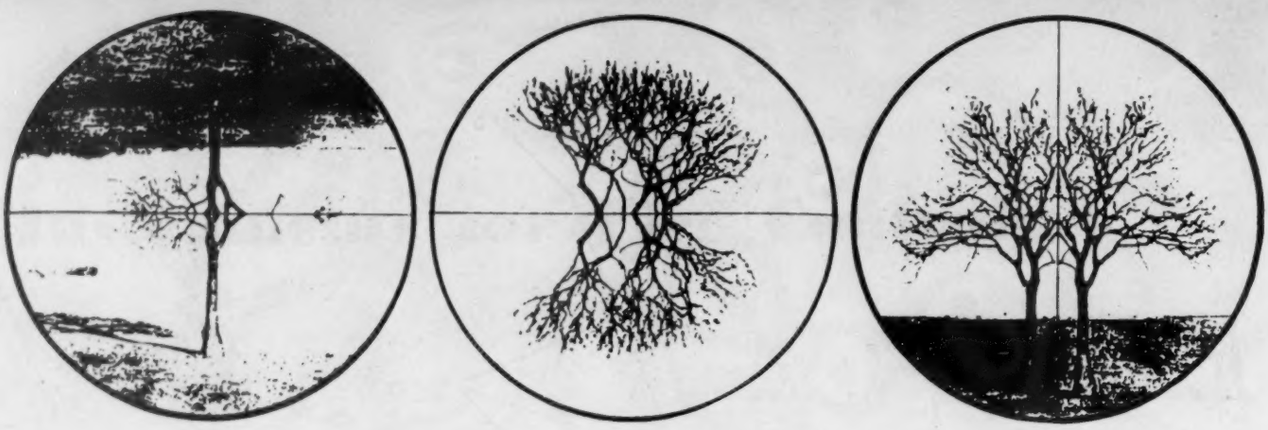


FIG. 6

Fig. 6—As seen through a rangefinder, the complete image of the object may be seen split as in Figs. 2 and 3. Also reverted or inverted partial images employed—according to the optical system. Center here shows "inverted upper image system"; left, "inverted lower image system"; right, "reverted or side-by-side system"

problem of movement in two dimensions, we add a third, as in the case of an aerial target, we become involved in three variables.

In Two Dimensions: Confining our attention to the first case for the moment, we might proceed thus: Let a pair of bars having slots cut in them be mounted in a horizontal plane and orientated in two directions at right angles. Let each bar be given freedom of rectilineal translation in a direction at right angles to the axis of the slot. Further, let a pin project through both slots at the same time. If this pin be mounted on an arm which is directed towards the target, and if the distance of the pin from the axis of rotation of the arm is always proportional to the range, then the displacements of the slotted bars from their zero positions give a measure of the position of the target in space.

In order to predict the future position of the target on the assumption of motion along the tangent to the path at the instant, let the slotted bars drive tachometers which register their rates of change of position with the reference to the co-ordinate axes in yards per second. By "matching pointers" those rates may be multiplied by the time of flight to produce the necessary corrections in the x and y components of the instantaneous range. This might appear to be a matter of some difficulty, but in fact—apart from ballistic corrections for drift, muzzle velocity, atmospheric density, wind, etc.—there is a very definite relation between the range and the time of flight in any particular case. Hence it is easy to cut a cam from a polar diagram exhibiting this relation and to use this cam to position a sliding block on a bar whose inclination is made to vary with the rate of change of the component in question. These "travel components" are thus combined mechanically with "present position" components to give the "future position" components wanted.

Anti-Aircraft Fire Control: When to the problem of gun-laying on targets moving in two dimensions, we add a third dimension for firing upon aircraft, the problem becomes more troublesome but not insoluble. Some 25 years ago the writer proposed to use a coincidence type aircraft rangefinder as a gun sight, rangefinder and gun being interconnected in such a manner that the act of taking the range automatically laid the gun. The device embodied as an essential feature a three-dimensional cam virtually composed of a series of laminae, each of which corresponded to some particular range. Although no effort was made to introduce prediction (the speed and "ceiling" of aircraft being much less than they are today) the Inventions Board of the British Ministry of Munitions to whom the proposal was submitted, made reference in their reply to the abandonment of similar proposals on account of their "inherent complexity."

Basically the methods in use today, involve some

Fig. 7—Eye-piece prism combination. Front elevation at left, plan view at right. It consists of three prisms of optical glass cemented together with Canada balsam. The dotted and solid lines show path of rays of light from right and left-hand reflectors, respectively

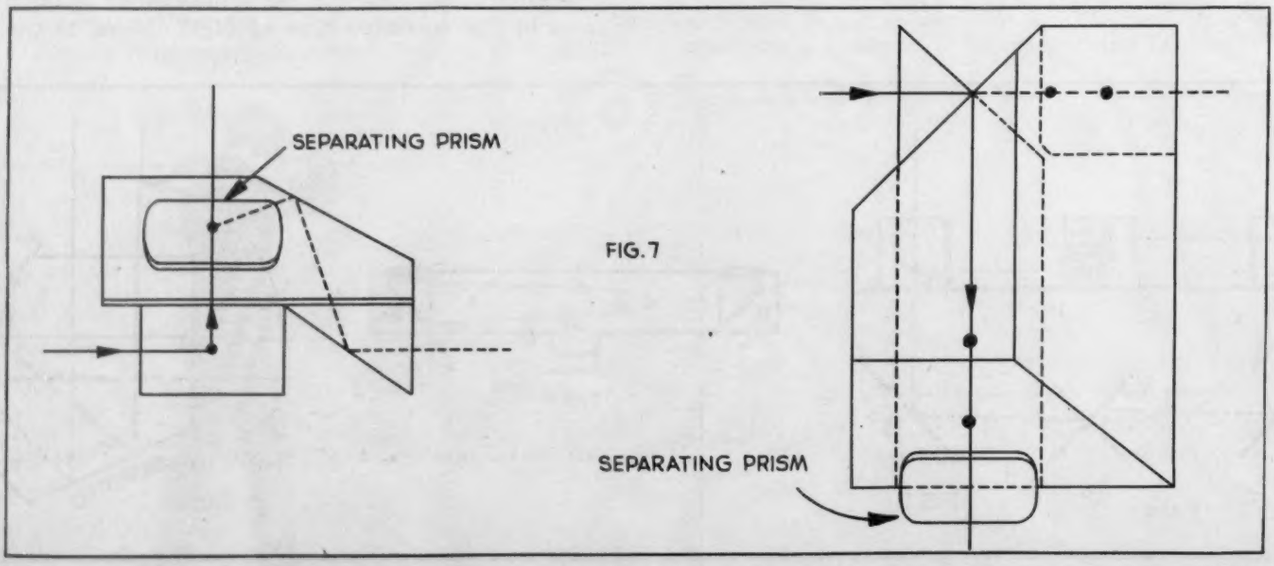


FIG. 7

WHAT *Carpenter* IS DOING TO HELP YOU GET THE MOST OUT OF STAINLESS STEEL

AT a time like this, getting the most out of the metal you use is not only important to your own production problem, but to national defense as well.

There are several ways by which we at Carpenter are attacking this problem as far as Stainless Steel is concerned.

First, by continuing to maintain our rigid quality control over operations greatly expanded to meet new capacity requirements. This means that the strip and bar stock reaching our customers can be counted upon to have the same uniform fabricating qualities as always.

Second, through a service program which aims to help Stainless users select the analysis that will best meet their particular fabrication and corrosion resistance requirements.

Third, by making available metallurgical and engineering assistance in solving new and different problems of fabrication. This helps prevent trouble *before it starts,* conserves metal for vital defense needs, and speeds production.

It is our earnest desire to have you make full use of our service department and our technical assistance. Your Carpenter representative's experience, covering a wide range of Stainless production problems, is yours for the asking.

Printed working instructions on each type of Carpenter Stainless are available to provide your production and engineering departments with many helpful, time-saving suggestions. Questions concerning cutting oils, grades of abrasives, deep drilling methods, and a host of other Stainless fabricating problems are answered in Carpenter's service literature. If you do not already have this helpful information, ask your Carpenter representative for it.

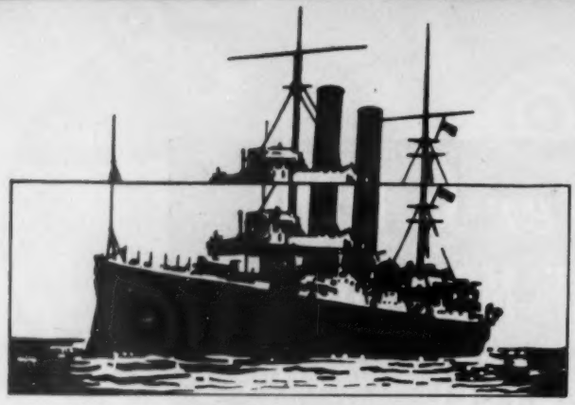
THE CARPENTER STEEL COMPANY, READING, PA.

TO THE DESIGN ENGINEER WHO IS LOOKING TO TOMORROW . . .

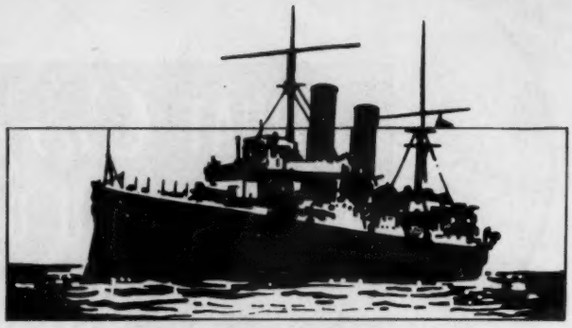
After the emergency, Stainless will be honorably discharged from its defense service. Then there will be hundreds of products waiting for it. Forward-looking design engineers are planning now to cash in on the Stainless World of Tomorrow, by preparing to give their after-the-war products the sales appeal *(profit appeal)* of Stainless Steel. Ask for your copy of this booklet containing practical hints on Stainless design. It shows how to design Stainless products for greater economy . . . how to avoid many fabricating difficulties . . . how to get the right finish.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

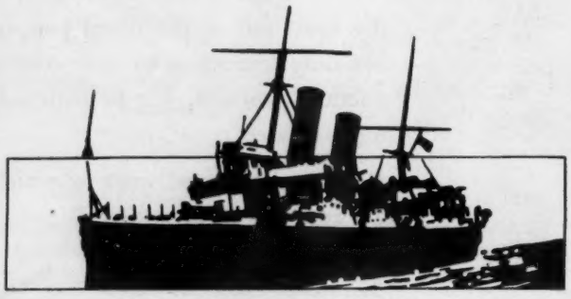


DUPLICATION



UNEQUAL MAGNIFICATION

DEFICIENCY



DEFECTIVE "POI"

FIG. 8

Fig. 8—The "halving glass" enables the operator to correct for "duplication" and "deficiency" as shown here. Other devices correct for "unequal magnification" and "defective POI"

tracking device (e.g. a telescope) both for elevation and azimuth, together with a height finder which automatically gives a continuous measure of the height. Rates may thus be established along two axes at right angles and, the rate of movements along each axis being multiplied by the time of flight of the projectile, the projection of the target in the horizontal plane at the end of the period of flight, may be determined. This, together with the height (modified by spot corrections) gives the future position of the enemy plane.

Logarithmic Solution: One rather ingenious method of solving the equation, h equals r sin a, (in which "h" is the height of the target, "r" is the range and "a" the observed angle of elevation) is first of all to turn this equation into its logarithmic form, log r plus log sin a equals log h, and then to use a differential gear in which one member is rotated in accordance with a logarithmic sine scale of angles of elevation and the other gear rotated in accordance with a logarithmic scale of ranges. The jockey wheel will then revolve around the axis of the differential with a motion corresponding to a logarithmic scale of heights. In practice, the conversion of the motion of the rangefinder scale (which is a "reciprocal" one as will hereinafter be explained) to logarithmic scale motion is accomplished by toothed spiral gears; so also the angular motion of the range finder in elevation is converted into motion corresponding to a logarithmic scale of sines by the same means. The movement of the jockey then gives a measure of the height in terms of log h from which of course, using a suitable scale, readings of the height can be obtained directly.

Among the methods of mechanically computing ballistic data, the three-dimension cam, to which reference has already been made, is used. Each section normal to the axis of the cam is calculated for a particular firing table condition. The difference between the modern application and its employment without prediction arise from the operation of the cam in terms of the future horizontal range and the translations of the follower pin in an axial direction in terms of the future altitude. The displacement of the follower pin outwardly from the axis of the cam is then a measure of the quadrant elevation of the gun.

The Rangefinder: Thus far the means whereby the range of the target is determined rapidly and continuously have been referred to merely by name. Since the rangefinder is the very heart of the entire fire-control system, some account of the workings of the more familiar types and especially the coincidence type is in order.

For rather obvious reasons the very latest refinements of rangefinder construction cannot be discussed

More Information on Modern Shell Production

STEEL's first reprint handbook on "Modern Shell Production" detailed the methods and equipment necessary for the most efficient production of high-explosive shell—that is, the shell body which undergoes fragmentation as it reaches its objective. Over 1000 copies of this 76-page book have now been distributed and a limited supply is still available at $1.00 per copy.

Now, a second handbook has been compiled. It goes into further detail on the manufacture of shell, as well as brass cartridge cases, small arms ammunition, shell and bomb fuzes, the flight of the projectile and the airplane bomb. This second handbook is attractively bound, fully-illustrated and entitled "More Information on Modern Shell Production." Orders should be addressed to STEEL, Readers Service Department, Penton Building, Cleveland. Price, 50 cents per copy.

TO A WAITING BUYER IN THE *Argentine*

Safely Protected with FIBREEN

DAMP, penetrating salt air—exposure and rough handling . . . even dust and dirt . . . lie ahead for goods consigned overseas. The problem of protection for export shipment is tough . . . but exporters are solving it, effectively and economically, by the use of FIBREEN.

Here is a reenforced paper, so tough, so waterproof, so rugged that it is used to wrap 10-ton bundles of steel for shipment on open freight cars — so pliable and convenient it can be used in any shipping room to wrap the smallest of parcels.

FIBREEN and The Sisalkraft Co. hold a unique position in the field of protective wrapping and packaging. They offer the ideal combination of material, plus experience and research as applied to problems of protecting goods in shipment or in storage.

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Investigate FIBREEN. Tell us what you ship and how you now package it. We offer you the assistance of our research staff, and a quantity of FIBREEN for your own trial and experiment. There is no obligation. Write us, outlining *your* packing requirements.

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Only when you get a sample in your own hands can you realize that a *paper* can be so strong — so tough — and impervious to moisture. There is no other material like FIBREEN. Available promptly in rolls and blankets of many widths. Write for sample.

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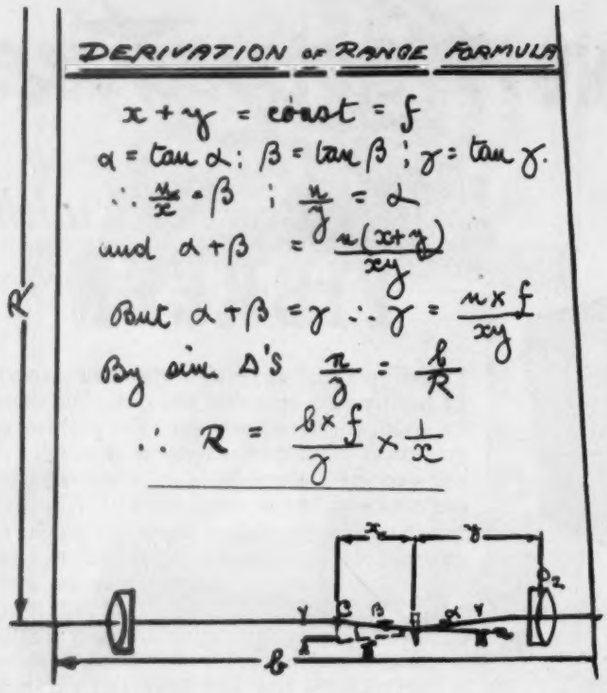

Fig. 9—Geometry of Barr & Stroud rangefinder in lower portion with derivation of the range formula shown above

here except insofar as these relate to instruments of German origin. However, as it happens, few changes of any considerable importance have been made in several years, the basic principles and major features of construction having been well established by the period of the first World war. Bausch & Lomb in this country and Barr & Stroud in Scotland are principally responsible for our present ability to design and produce the required instruments. It is indeed difficult for the layman to comprehend the magnitude of the contribution which organizations of this caliber make to the national welfare in times of crisis such as these, when literally only a small handful of men possess the necessary knowledge and skill to produce an essential optical instrument whose accuracy and ruggedness are little short of miracles of mechanical ingenuity.

The evolution of the rangefinder of the short base type now commonly employed for both land and naval operations is of exceptional interest. From the earliest times the calculation of the distance to an inaccessible object has involved the solution of a triangle of which the base was known and the adjacent angles measured, an instrument of the theodolite type being used. In the heat of battle, however, the leisurely methods of the land surveyor are impractical and furthermore the base of the triangle must of necessity (especially at sea) be quite short.

In the earlier forms of short-base rangefinder in use up to at least 30 years ago in the Royal Field Artillery (Britain), two theodolites in effect were used, the base being an inextensible cord 25, 50 or 100 yards long which was stretched by the observers bracing their weight against its tendency to sag. See Fig. 1. One of these instruments, the left in Fig. 1, had a rightangle setting, the observer maneuvering his sights until the image of the target and the small white vane on the righthand instrument were in coincidence. He then sang out "On" and kept singing it out as long as was necessary to advise his colleague that the target, the lefthand instrument and the righthand theodolite were situated at the three corners of a long narrow right-angled triangle. The righthand man then adjusted the small telescope of his instrument in azimuth until he, on his part, secured coincidence between the images of the target and the white vane of the left-hand instrument. Engraved on the drum operating his rotatable mirror was a spiral scale giving the range directly and thus avoiding any calculations of the sine function of the angle subtended by the base of the instrument at the target, which is in effect the quantity all rangefinders measure.

Among the disadvantages of this arrangement were the exposure of the observers to enemy fire and the difficulty of securing accuracy, since the human supports were never absolutely rigid. Before this type of rangefinder was abandoned, single-observer instruments appeared with the elements mounted in a rigid frame. As far back as 1775, an optician named Magellan devised a simple arrangement embodying a telescope and two mirrors inclined at a small angle to one another, which depended for its success on the coincidence of two superimposed images and the proper adjustment of a variable base. This principle was developed by Brander for military purposes a few years later.

The precursor of all modern rangefinders of the coincidence type was that patented in 1858 by General Clark. In Fig. 2 this unit is shown directed toward a distant object (the new moon). Here the two halves of the total picture are in "coincidence." If, however, the object were situated at a finite distance it is easy to see that the two halves of the whole image would not be in coincidence but would be displaced relatively in a horizontal direction as shown in Fig. 3. This displacement was measured by a calibrated micrometer screw which then gave the range. Thus, strictly speaking, this unit is not a coincidence-type rangefinder. It was, perhaps, the earliest instrument of fixed base length, permitting simultaneous observations by a single observer.

In 1860 Adie secured a basic patent on a rangefinder which included an optical system consisting of two objectives, end reflecting prisms, central reflectors and eyepiece as shown, illustration Fig. 4. A bar pivoted at C and capable of adjustment by means of the micrometer head S carried the right-hand reflector which could thus be rotated through a small angle to secure "coincidence" of the partial images originating in the two telescopic systems. The principal weakness of this early design was the inability of the simple system of reflecting separating prisms to secure a sharp dividing line between the partial images—a prerequisite to accurate work.

During the years that followed the appearance of the Adie instrument, various means were developed to secure coincidence of the partial images, but all were unable to measure ranges with the accuracy demanded by the growing power of modern ordnance. Lack of precision came from use of plane and reflectors whose disposition altered with every change of

Dan Griffin Speaks for Steel...

★ Below are quoted the remarks of Dan F. Griffin, a steel worker in the Campbell Works of The Youngstown Sheet and Tube Company, made recently at a meeting of a Youngstown, Ohio, civic club. Reflecting the attitude of Youngstown employees, his words should be of interest to the users of Youngstown steel.

"Today, the eyes of the world are turned upon the ever-increasing conflagration in Europe. We realize that our nation has undertaken the gigantic task of transforming a peace-time nation into a nation geared to total national defense.

"The steel mill employee is playing an ever-increasing and more important role in this task; and the American steel man is tops in the industry.

"We know that as much depends upon the skill and devotion of these steel mill employees as on our armed forces on land, sea, and in the air. To a man, the steel mill employees of America appreciate they are among the highest paid workers in the world. Their working conditions are the best.

"The American steel worker has plenty of leisure time to do as he will. He can work in his garden; he can seek any form of entertainment, not only for himself but also for his family. He can study to improve himself, and quite frequently does. He is in no way limited.

"The highest office in our land has been occupied by men of the most humble birth. Freedom in America has never had a price, but its rewards are unlimited. Your steel mill employee knows that he cannot buy freedom—he must think freedom—he must work for freedom.

"We treasure our American way of life as we have it today. We're prepared to go to any lengths to preserve for ourselves and for our children that tranquility, that comfort, that peace, which we have enjoyed in years past.

"We're willing to pay our share in money or labor—yes, we are already lending. We want our boys to serve—they're already being trained for service.

"Our steel workers' creed should be an all-out effort to procure peace for ourselves and for the rest of the world. If we must work harder or longer to produce the steel necessary to insure that peace, then we're ready and anxious to do our bit, for in that way only do we serve.

"The Army needs steel—we'll make it.

"The Navy needs steel—we'll make it.

"The Air Force needs steel—we'll make it.

"The whole world needs steel, and steel workers will make it, for the real steel man is a true American. He will never do or think anything to jeopardize America. He will do everything in his power to preserve America for Americans and Americanism.

"We'll remember, always, that the men of the Army, the men of the Navy, the men of the Air Force, those defending democracy and the men of production are all ONE.

"We're 'Sammies' on guard!

"The U.S. in United States means US."

THE
YOUNGSTOWN SHEET
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YOUNGSTOWN, OHIO

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shape of the supporting tube, whether this arose from change of temperature or mechanical stress. The devices for producing rotation of the end reflector were not very satisfactory, the least backlash being fatal.

The substitution of a "pentagonal prism" (see Fig. 5 showing end pentagonal as later used by Barr & Stroud) for a plane end reflector appears first to have been made by Colonel Goulier of the French Army about 1864. The important property of this reflector is that a small rotation of the prism about an axis normal to the plane of the figure will not affect the direction of the emergent beam of light. In other words, the accuracy of instruments employing this type of end reflector is unaffected by small deflections of the outer tube in which these reflectors, together with the objectives are mounted. This marked an exceedingly important advance in rangefinder design.

Thus the matter rested until 1888 when the British war office inserted an advertisement in *Engineering* calling for proposals from persons desirous of submitting infantry rangefinders for competitive trial. At old Yorkshire college, now the University of Leeds, this advertisement was called to the attention of Dr. Barr, who occupied the Chair of Engineering, and Dr. Stroud, names that have since become familiar the world over as the principals of the famous firm of Barr & Stroud. It is a remarkable tribute to their genius that the principal features of the instrument which they designed have remained unchanged with the passage of the years although neither inventor was familiar at the time with the features of earlier rangefinders.

In 1891 the Admiralty requested Barr & Stroud to submit an instrument which was tried at Chatham on H. M. S. ARETHUSA in April 1892 and found to more than satisfy the navy's requirements as to accuracy. As a result, the navy ordered five of these instruments in 1895, the first order actually received and paid for.

The permissible error laid down in the navy's specifications governing the manufacture of these early instruments was 3 per cent at 3000 yards. As a striking illustration of what a permissible error of, say 1 per cent at 3000 yards means, if we attach pointers TWO MILES LONG to the rangefinder and bend the frame so that while one pointer remains stationary, the other moves ⅝-INCH AT ITS OUTER END, the errors introduced will exceed 1 per cent at 3000 yards. This may indicate the nature of the mechanical and optical problems necessary to overcome to meet the accuracy required.

Note in Fig. 9 that not only did the Barr & Stroud instrument make use of end "pentagonals" or reflectors, see Fig. 5, but that all errors from wear of parts involved in measuring these exceedingly small angles were avoided by the use of an achromatic deflecting prism placed in the path of the beam from one of the end reflectors, the righthand one here. A relative movement of the split images is caused by an axial movement of the prism—the nearer the target, the further to the right must the prism be moved and vice versa. For the sake of clarity the paths of the pencils of light through the central reflectors or "eye-piece prisms combination" in Fig. 9 have been straightened out.

The deflecting prism is adjusted so the partial or split images of the particular feature of the target are in "coincidence" at C. These two partial images may form a complete picture of the object (split images as shown in Figs. 2 and 3) or an inverted image in one of the arrangements shown in Fig. 6 may be employed.

With the arrangement in Fig. 9, a comparatively large movement of the prism corresponds to a relatively small displacement of the partial image. In practice all we have to do is to attach to the movable deflecting prism, a suitably engraved scale which may be read by a separate observer or, in the case of the smaller instruments, the partial images may be observed for coincidence by one eye while the other reads the range on the scale.

To afford some numerical idea of quantities involved in this instrument, suppose the unit has a 4.5-foot base. Let the focal length of the objective be 26.1 inches. The movement of the prism between a range of 250 yards and infinity then is about 6 inches. Since the whole angle available for subdivision between ranges of 250 yards and infinity with this base length is only 20 minutes, the average motion corresponding to a second of angle is 0.005-inch, a distance that can easily be read with a magnifying lens.

Even with a fine line separating the partial images, the resolving power of the eye is limited to about 12 seconds of angle; that is, the unaided eye cannot measure the angle subtended at the target by the base of the instrument to a greater degree of accuracy than this. An obvious remedy is to introduce telescopic objectives into the beams proceeding from the target and view the partial images through an eye-piece of sufficient resolving power. Thus to measure an angle of one second, a telescopic system having a magnifying power of 12 diameters must be used.

The eye-piece prism combination, Fig. 7, is exceedingly interesting optical device. It brings the partial images from the two ends of the rangefinder into the field of the eye-piece and separates them by an exceedingly fine dividing line. This particular system employs three prisms of optical glass cemented together with Canada balsam. The chain and full lines show the course of the rays of light from the right and lefthand reflectors respectively, the image transmitted from the righthand reflector forming the upper half of the field of view. The objectives, of course, invert the images, but the prisms re-invert them so an erect image is seen by the observer.

Light from the right and lefthand reflectors approaches the separator at slightly different angles such that the light from the righthand reflector which falls on the upper face of the separating prism is refracted out toward the eye, while that portion which falls on the lower face is refracted at a different angle and does not enter the eye-piece; and vice versa. A complete separation is effected in this way, the dividing line between the partial images being the inter-

(*Please turn to Page* 102)

High Speed Steels

(*Concluded from Page 61*)

ture (1200-1400 degrees Fahr.). Small tools heated as above may be rolled in a box of borax. Another method more suitable for finished tools is to apply the borax or boric acid in the form of supersaturated water solution. In such cases the tools are immersed in the solution at 180-212 degrees Fahr., or it may be applied with a brush or spray. Pieces so treated are heated as usual with care taken in the handling to insure good adherence.

Special protective coatings* or paints when properly applied have been found extremely useful. They do not fuse or run at the temperatures used and therefore do not affect the furnace hearth. When applying these coatings, it is necessary to have a surface free from scale or grease to insure good adherence. They may be sprayed or brushed on and usually one thin coat is sufficient. Heavy coats tend to pit the surface of the tool and in addition cause difficulty in its subsequent removal. Tools covered with these coatings should be allowed to dry before charging into the preheat furnace. After hardening and tempering the coating can be easily removed by light blasting with sand or steel shot. When tools are lightly ground, these coatings come off immediately.

Special Suggestions: As in the case of tungsten high speed steels, tools with sharp corners, variable cross-sections or very large sizes should not be given too drastic a quench in oil. It is better to remove the tool from the oil when cooled to or just below a red heat and allow it to cool in the air. Equalizing in lead or molten salt at about 1100 degrees Fahr. and then cooling in still air is good practice.

Single point cutting tools, in general, should be hardened at the upper end of the temperature range as given in Table II. Slight grain coarsening on such tools is not objectionable when they are properly supported in service and not subjected to chattering.

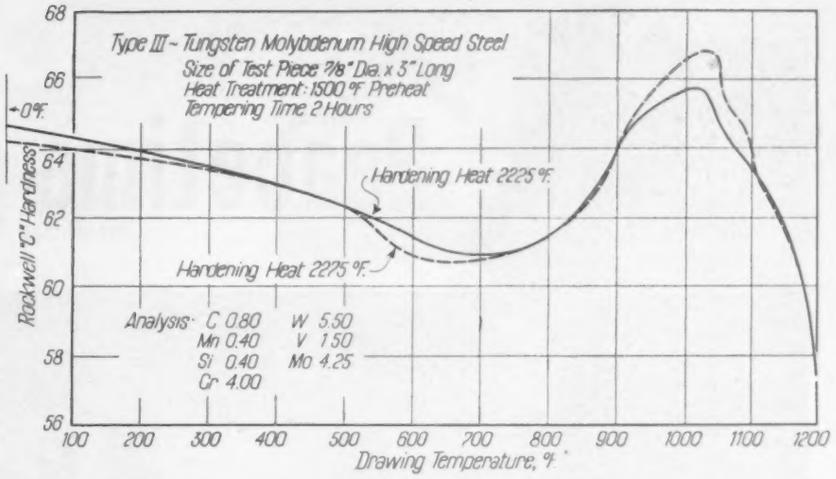
However, when such tools are used for intermittent cut, it is better to use the middle of the temperature range. All other cutting tools such as drills, counter sinks, taps, milling cutters, reamers, broaches, form tools, etc., should be hardened in the middle of the range.

Certain applications requiring a maximum toughness (to resist shocks) will require the lower end of the hardening range. Examples are: Slender taps, cold punches, blanding and trimming dies.

The molybdenum high speed steels may be pack hardened following the same practice as used with tungsten high speed steels but keeping on the lower side of the hardening range (approximately 1850 degrees Fahr.).

Molybdenum high speed steels will take all the special surface treatments including nitriding by immersion in molten cyanide that are applied to tungsten high speed steels for certain applications.

When borax and boric acid are used in a furnace with a silicon-carbide bottom, it is necessary to use a metal pan preferably of stainless iron to prevent the borax from fusing with the silicon-carbide. Such fusion produces a glass-like insoluble coating on the tool which is impossible to remove without damage to the cutting edge of the particular tool.



*The tradenames of these products that are known at present are as follows: No-Carb, Park Chemical Co., 8074 Military Ave., Detroit, Mich. Sel-Car, National Copper Paint Co., 110 S. Dearborn St., Chicago, Ill. Ferritol, E. F. Houghton, 3rd, American & Somerset Sts., Philadelphia, Pa.

SALT BATH METHOD FOR HARDENING

Molybdenum High Speed Steels*

■ INTRODUCTION: One of the contributing factors in the use and adoption of the molybdenum types of high speed steels as a substitute for the 18-4-1 has been the electric salt bath method for hardening. Because molybdenum high speed steels decarburize when heated, the conventional type furnaces are not satisfactory for hardening. The electric salt bath method when properly controlled eliminates this decarburization and is satisfactory for all types of molybdenum high speed steels.

Salt Bath Furnaces: In general, immersed electrode furnaces are being used where there is sufficient production to keep furnaces operating at a reasonable capacity. There are on the market today several types of immersed electrode salt bath furnaces and several types of salt baths. As a guide to those who are considering purchasing or installing such equipment, it is recommended that the selection of this equipment be made to suit their own production requirements from the equipment recommended.

The immersed electrodes generate heat directly in the molten salt bath itself by the electrical resistance of the bath material, and produce a positive circulation of the bath, due to the internal stirring action caused by the electrical flow between the electrodes. This stirring action increases the speed of heating and eliminates local overheating thus aiding close temperature control which is always advantageous. A properly selected and maintained salt bath prevents scal-

Prepared by a special committee of the O. P. M. The personnel of this commitee is as follows: A. F. Holden, chairman, James McElgin, J. N. Bourg, W. J. Levy and J. Edward Donnellan, secretary.

Peacetime Engineering

Go over fastening jobs with a Parker-Kalon Assembly Engineer—

To Reduce Man Hours . . . Speed Work . . . Simplify Design . . . Get Stronger Fastenings!

Sheet metal, heavy steel, die castings, plastics . . . no matter what material your defense production uses, the chances are 7 out of 10 that a Parker-Kalon Assembly Engineer can help you simplify its design for faster, lower-cost assembly with Parker-Kalon Hardened Self-tapping Screws. His recommendations are unbiased. He does not take orders, and he has no single product to sell. For Parker-Kalon manufactures every type of Self-tapping Screw – both thread-cutting and thread-forming – and will offer you only the right type and head style for the job. * * * For Results: Submit a description of your assembly to Parker-Kalon Assembly Engineers by mail, and they will return it with recommendations and samples. For better results: Ask for a Parker-Kalon Assembly Engineer to call at your plant to go over your fastening problems and point out opportunities to use faster and better P-K fastening methods wherever possible.

SELF-TAPPING SCREWS FOR EVERY METAL AND PLASTIC ASSEMBLY . . . AND OTHER FASTENING DEVICES

that had a date

with destiny

All through the long peacetime that preceded the present emergency, Parker-Kalon Assembly Engineers were applying Parker-Kalon Hardened Self-tapping Screws to hundreds of products. Building up a fund of engineering knowledge that defense manufacturers will find invaluable in the job we face today.

Engineers For Defense

The fastening problems of defense production come first with Parker-Kalon Assembly Engineers! They are in daily contact with engineers and production officials of plants like yours, and are thoroughly familiar with present day assembly practices. They can help you to redesign for faster, lower-cost assembly. They can show you – as they have 7 out of 10 concerns – why Self-tapping Screws are more economical and easier to use than machine screws in tapped holes, nuts and bolts, rivets, welding. And, why they make stronger fastenings, too!

You Can Change Overnight – To Speed-up Assembly!

If your application is one of those 7 out of 10 where these modern fastenings can make a big time and labor saving, remember that you need no special tools, no major changes in your production line to gain their benefits. *You can change overnight! And unskilled hands can drive them.*

As a further assurance of savings in hours and dollars, remember that the Parker-Kalon Laboratory – without counterpart in the industry – guards the quality of these Screws, as it does with all Parker-Kalon products – with its rigid Quality-Control. Remember that when you adopt them, you are using products that are saving time and labor for hundreds of manufacturers in the defense industries, including every aircraft builder you can name from Douglas to Taylorcraft; shipbuilders like Bethlehem and the Navy Yards; leading truck, tractor and tank manufacturers – among them, Ford, Chrysler, General Motors, Fruehauf, Mack, Pullman-Standard Car; radio and general equipment manufacturers such as Philco, RCA, Western Electric, Westinghouse, General Electric and Sperry.

Have a Parker-Kalon Assembly Engineer call at your plant and help speed your defense orders. Parker-Kalon Corp., 194-200 Varick Street, New York, N. Y.

PARKER-KALON
Quality-Controlled
SELF-TAPPING SCREWS

TANK PARTS . .

And similar "heavy" assembly jobs are not far removed from the problems involved in assembling these heavy stoker parts. Hex Head Self-tapping Screws replaced ordinary cap screws in fastening cast iron inlet ring to steel fan housing, for Brownell Company. Tapping was eliminated, assemblies made stronger.

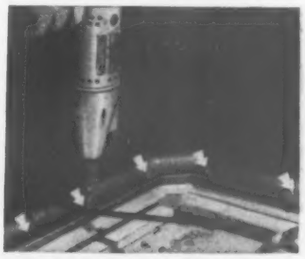
RANGE FINDER?

No, this is a part of a permanent wave machine. But its manufacturer uses tiny Type "Z" Self-tapping Screws to fasten plastic to aluminum and to plastic, avoids excessive loss from tap breakage and rejection of mistapped parts. Makers of instruments and small items of defense equipment please note.

BOMB FUSE . . .

assembly problems would be simple for the Parker-Kalon engineer who helped save 6¢ per unit on this electric kettle. Type "Z" and Hex Head Self-tapping Cap Screws did away with slow, costly tapping in shallow blind holes, tap breakage and damaged parts. The steel parts and cast base are easily, quickly fastened to cast aluminum.

FIELD KITCHEN . .



manufacturers will be interested to know that American Gas Machine Company secures sheet metal housings to steel frames in 26% less time with Parker-Kalon Hex Head Self-tapping Cap Screws. Equally important, they ended complaints on fastenings loosened in transit.

ing or oxidation of the work, and also when properly controlled prevents surface decarburization.

The following equipment is recommended:

For Heavy Production and Constant Use:

A three pot unit consisting of:

(a) Immersed Electrode salt bath pre-heat furnace
(b) Immersed Electrode salt bath high heat furnace
(c) Immersed Electrode salt bath quench furnace
(d) Optional: For extremely heavy production or large or intricate sections, two preheats are advantageous; the first to be operated at 1100-1300 degrees Fahr. and the second one at 1500-1600 degrees Fahr.

For Medium or Light Production, but used Intermittently:

A three pot unit consisting of:

(a) Gas or oil heated salt bath preheat furnace.
(b) Immersed Electrode salt bath high heat furnace.
(c) Gas or oil heated salt bath quench furnace.

Salt Baths for Hardening: The manufacturers of salt baths (listed at the end of this report) offer complete information on the method of use, as well as the method of chemical control, so that tools may be hardened free from any pitting or decarburization.

Decarburization or pitting in the high heat salt bath is usually caused by the presence of oxides. However, the manufacturers of salt baths supply a neutral bath containing a suitable deoxidizer or rectifier for the bath, which is sufficient to keep the bath free from oxides under normal operating conditions.

Under abnormal operating conditions where a sufficient amount of new salt has not been added, it becomes necessary to make supplementary additions of rectifier material supplied by the manufacturer. These manufacturers will supply information as to procedure for simple chemical control to maintain the salt bath in a suitable condition.

When a refractory or brick lined pot is used there is less tendency for formation of oxides in the bath.

Procedure for Salt Bath Hardening: For recommended temperatures for hardening in the salt baths refer to the OPM committee report for the Heat Treatment of Molybdenum High Speed Steels. Briefly, the procedure is as follows:

A. Clean work free from scale, rust, oil, grease and moisture. Use either solvent degreaser or suitable alkaline cleaner, followed by a clean hot water rinse, and thorough drying. Every precaution must be taken to prevent moisture on tools going into the salt, as wet tools may cause a steam explosion, burning the operator.

B. Immerse in preheat salt bath, temperature 1500-1550 degrees Fahr. Allow sufficient time for work to reach temperature of bath.

C. Transfer to high heat salt bath, temperature 2150-2250 degrees Fahr. Allow sufficient time for work to reach temperature of bath, plus proper soaking time at temperature. (See the heat treating practice by the OPM Committee on the Heat Treatment of Molybdenum High Speed Steels.)

D. Transfer to quench bath, temperature 1100-1200 degrees Fahr. Allow sufficient time to cool to bath temperature. Two to five minutes will suffice, depending upon size. Remove from salt bath and cool in air or oil. Quenching in oil is not recommended for work of intricate design or work where distortion is likely to occur.

E. After work has cooled to room temperature, wash off all adhering salts in a hot alkaline cleaner. If the work is to be tempered in a furnace (air atmosphere), the work should be shot or sand blasted or cleaned by other methods, to insure removal of all adhering salts. If this is not done, the salt will attack the work during the tempering. If a salt bath is used for tempering, the work need only be cleaned in a hot alkaline solution or hot water.

F. For tempering, see the practice by the OPM committee on the Heat Treatment of Molybdenum High Speed Steels.

Effect of Salt Bath Hardening: A. The molybdenum high speed steels when hardened in salt baths are entirely surrounded by neutral molten salt. A salt film is retained on the tool throughout the hardening procedure, thus preventing decarburization or scaling.

B. The salt bath hardening method provides uniform heating; and this generally results in less distortion. All sections of intricately shaped tools are uniformly heated by this method. The salt bath permits selective hardening.

C. When a salt bath is properly selected and properly maintained, there is no chemical attack by this bath on the molybdenum high speed steels. The original surface of the steel is retained.

Molybdenum high speed steels will take all the special surface treatments, including nitriding when immersed in molten cyanide, that are applied to tungsten high speed steels for certain applications.

There are many installations of salt bath furnaces now in use for hardening molybdenum high speed steels. The manufacturers of salts and salt bath furnaces listed below are qualified by experience to give complete engineering service:

Electrode Salt Bath Furnace Manufacturers: Ajax Electric Co., Philadelphia; Pellis Heat Treating Co., Branford, Conn.; Commerce Pattern Foundry & Machine Co., Detroit; the A. F. Holden Co., New Haven, Conn.

High Speed Salt Bath Manufacturers: Bellis Heat Treating Co., Branford, Conn.; the A. F. Holden Co., New Haven, Conn.; the E. F. Houghton Co., Philadelphia; Park Chemical Co., Detroit.

Gas or Oil Fired Pot Furnaces: Any furnace manufacturer producing pot furnaces, of which there are approximately 25.

CONTROLLED ATMOSPHERE FURNACES

For Heat Treating

Molybdenum High Speed Steels

■ INTRODUCTION: Molybdenum high speed steels have a tendency to develop a soft surface when heated to the hardening temperatures. Because of this tendency, it is necessary and important to exercise certain well established precautions to protect the surface of these steels.

In addition to the application of protective coatings when conventional type furnaces are used, and also the use of high temperature salt baths, atmosphere controlled furnaces satisfy this demand for surface protection against attack. These furnaces are now available in both electric and fuel fired types where the atmosphere is independent of the source of heat. This permits control of the atmosphere in contact with the work to be treated. Small and delicate pieces can

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Prepared by a special committee of the O. P. M. The personnel of this committee is as follows: C. I. Hayes, chairman, P. B. Crocker, W. M. Hepburn, Norbert Koebel, Karl Ness, and J. Edward Donnellan, secretary.

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PERFORMANCE DATA

OPERATION—Taper Turn Locomotive Frame Bolt
MACHINE—Warner and Swasey 1-A Universal Turret Lathe
MATERIAL—S.A.E. 3140 Steel
SPINDLE SPEED—398 R.P.M.
CUTTING SPEED—208 S.F.P.M.
FEED—.020 inch
DEPTH OF CUT—⅛ inch to ¼ inch
CUTTING LUBRICANT—1 part Sunoco to 20 parts water

Photo Courtesy of THE WARNER & SWASEY CO.

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be given the heat treatment that will develop the good properties of the steel without injuring the surface or overheating thin projections.

The ideal atmosphere is one that is not harmful to the steel. The atmospheres commonly used are products of combustion and inert gases both of which have been cleaned of undesirable constituents and closely regulated as to composition.

The manufacturers of atmosphere controlled furnaces that are in general use for the hardening of molybdenum high speed steels are listed in this report. In each case, it is claimed by the manufacturer that these furnaces, when properly operated, have proved satisfactory in eliminating decarburization or other harmful attacks in the heat treatment of molybdenum high speed steels.

Characteristics of Atmospheres Capable of Protecting Modybdenum High Speed Steels: An atmosphere for the successful heat treatment of molybdenum high speed steels must be: 1. Capable of preventing decarburization; 2. Capable of preventing excessive carburization which will cause wrinkling of the surface, melting of the edges, pitting, and embrittlement of the cutting edge; and 3. Capable of preventing harmful scale or oxidation.

Preheat Temperatures—To prevent the above changes from taking place, the atmosphere for the preheat temperature is just as important as the atmosphere for the high heat temperature. The atmosphere for the preheat temperature should have the same characteristics as the atmosphere for the high heat temperature. A high heat furnace equipped with an atmosphere for satisfactory hardening will be of no value if the proper atmosphere is not used on the preheat furnace.

High Heat Temperatures—As any one of several atmosphere control methods may be used, no general recommendations can be made regarding settings and methods of operation, but competent engineering service should be supplied by the furnace manufacturers. Complete operating information should always be given by the service engineers after the furnaces are installed.

List of Manufacturers of Controlled Atmosphere Furnaces: In the selection of atmosphere controlled furnaces, the purchaser should secure a guarantee that the furnace selected will satisfactorily harden molybdenum high speed steels for his paraicular needs without the use of surface coating materials.

The following firms are manufacturers of controlled atmosphere furnaces and upon request will supply bulletins and complete descriptions of their equipment. They will also supply references of those who are successfully hardening molybdenum high speed steels in their controlled atmosphere furnaces. These firms also extend engineering and metallurgical assistance to furnace users as well as heat treat samples or permit those interested to heat treat their own samples in the respective equipment under consideration: General Electric Co., 1 River Rd., Schenectady, N. Y.; C. I. Hayes Inc., 75 Baker St., Providence, R. I.; Hevi Duty Electric Co, 4212 West Highland Ave., Milwaukee; Lindberg Engineering Co., 221 No. Laflin St., Chicago; The Sentry Co.,* Foxboro, Mass.; Surface Combustion Corp., 2375 Dorr St., Toledo, O.

*The following manufacturers of conventional type furnaces use the Sentry Co. method for atmosphere control: American Electric Furnace Co., 27 Von Hillern St., Boston, Mass.; American Gas Furnace Co., Elizabeth, N. J.; Barkling Fuel Engineering Co., 402 No. Paulina St., Chicago, Ill.; Charles A. Hones, Inc., Baldwin, L. I., New York; and Dempsey Industrial Furnace Corp., Springfield, Mass.

One Way To Handle High-Explosive Bombs

■ Because of their uniform dependability, Safe-Line wire rope clamps, such as the one encircled above, are playing important roles at army air bases. Here one of these units, made by National Production Co., 4561 St. Jean avenue, Detroit, is shown in the act of lifting a high-explosive bomb into a bomber with the aid of a new type Ford bomb hoist truck

Cutting Tool Carbides Have Greater Hardness

■ Improvements providing both greater hardness and greater strength in various grades of Kennametal steel-cutting tool carbides are announced by McKenna Metals Co., 200 Lloyd avenue, Latrobe, Pa.

The new hardness and strength values for the four standard grades of tool carbides are as follows: KM, 77.6 rockwell C, 90.8 rockwell A, 350,000 pounds per square inch transverse rupture strength; KH, 78.6 rockwell C, 91.3 rockwell A, 275,000 pounds per square inch transverse rupture strength; K3H, 79.6 rockwell C, 91.8 rockwell A, 260,000 pounds per square inch transverse rupture strength; K4H, 80.6 rockwell C, 92.3 rockwell A, 225,000 pounds per square inch transverse rupture strength. Grade KM is exceptionally strong, enabling it to be used for shaping hard armor plate. It is used widely in shell turning tools.

Offers Goggles for All Types of Work

■ Seven different styles of safety goggles fitted with Super Armorplate lenses which can be ground to prescription have recently been made available by American Optical Co., Southbridge, Mass. These, according to the company, provide both eye-correction as well as eye-protection for industrial workers with defective vision.

The goggles include spectacle and side-shield types for different kinds of eye hazards, and the hardened lenses can be obtained in either clear white or glare protection glass.

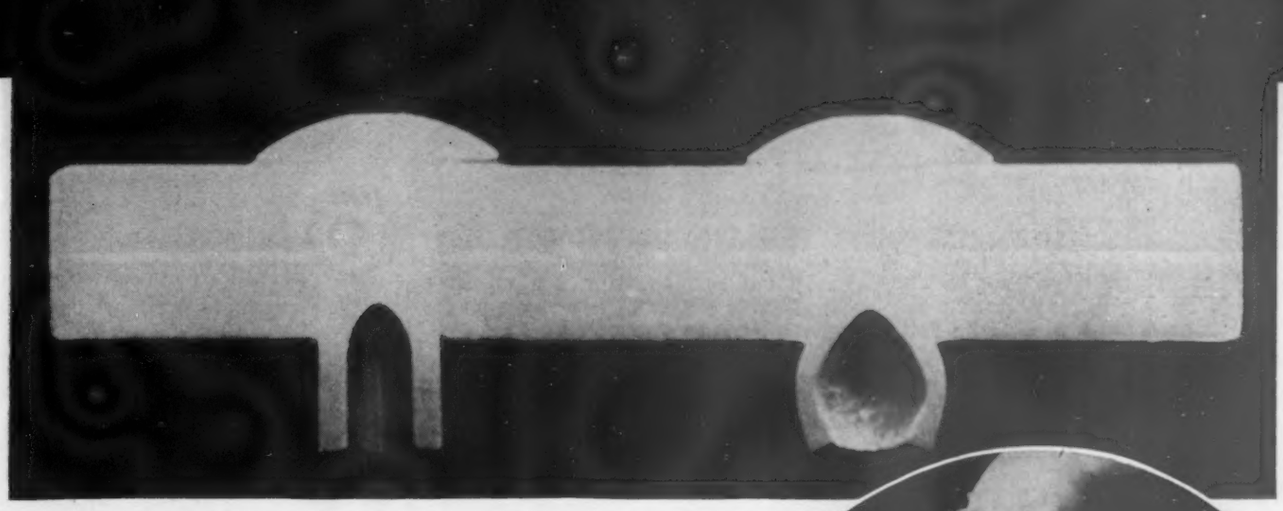


Fig. 1—View of new explosive rivets, above, showing the cross section before and after expanding

Fig. 2—The rivets are expanded by heating the rivet head using this especially designed electric iron, shown in view at right. Rivets are inserted in position prior to the expanding operation

EXPLOSIVE RIVETS

speed production

By D. L. LEWIS JR.

■ EXPLOSIVE rivets made by Du Pont, a recent innovation, may prove an important factor in speeding American aircraft production and simplifying design. Now being manufactured in commercial quantities, the rivet is of an entirely new type. A high explosive is placed in a cavity at the end of the shank. Heat applied to the rivet head by an electric gun detonates the charge. The explosion expands the charged end of the shank, thus forming a "blind" head and setting the rivet.

The whole operation is performed from one side of the work with exceptional ease and speed. Engineers estimate that from 800 fastening points in an all-metal pursuit plane to as many as 10,000 in the largest all-metal bomber are accessible only from one side. That fact has presented one of the most troublesome bottlenecks in the mass production of fighting planes. Under the best mechanical methods now employed, a skilled workman can set about two to four of these "blind" fasteners a minute.

The new explosive rivets may be installed by one workman at a rate of 15 to 20 rivets a minute, once they are in place. The riveting gun or iron weighs less than 5 pounds. The rivets themselves weigh only about one-fourth as much as generally used "blind" fasteners of mechanical design. So finely has the explosive charge been controlled, that the expansion it effects may be held within limits of 0.020-inch.

Two years of experimental work by the explosives department of the Du Pont Co., supplemented by extensive tests of the rivets on airplane production lines in recent months, stand behind the development. Engineers expect the invention to have wide applications in industry at large, and to effect radical changes in riveting methods and structural designs.

Much of aviation's phenomenal advance has been made possible by the development of the all-metal design, pre-eminently employing the lighter metals such as aluminum and magnesium alloys. This style of construction requires some 40,000 to 500,000 rivets or more per plane, according to the size. The job is one of the most exacting and tedious that confronts plane builders and grows more so as planes become larger, which is the trend. For example, the recently completed B-19 Douglas bomber, largest ship of its kind ever built, is said to have 3,000,000 rivets.

Gang riveting machines, automatic hole-punching and rivet-driving devices, and the occasional replacement of rivets by high amperage spot welding have tended to simplify the tremendous fastening problem to an important degree. However, these methods, together with the driving of conventional rivets individually by 2-man crews—usually at a rate of two to three rivets a minute—are applicable only in assemblies which permit access to both sides.

Fig. 1 shows the new Du Pont explosive rivets in both the original and installed condition. Prior to installation, the rivet is similar to a solid rivet except for the cavity which is concentric with the shank and open at the shank end. The cavity holds the small explosive charge which, when heated to a certain temperature, detonates and expands the shank end uniformly without cracking. The rivet to the right in Fig. 1 shows the shape of the shank after expansion. Due to the nature of the explosive, no wadding or confinement is required.

The heat necessary to detonate the charge is supplied by means of a specially designed electric tool with a silver tip. The application of the iron to the die-formed head of the rivet is shown in Fig. 2. Only 1½ to 2½ seconds elapses from the time the riveting iron is applied until expansion takes place. Thus one operator can install from 15 to 20 rivets per minute after the holes have been prepared and the rivets placed.

The rivets now being manufac-

tured are of an aluminum alloy and of varying diameters and sizes to meet structural requirements. They are of the modified brazier head and countersunk types, the latter permitting the flush riveting required by modern high-speed planes. The rivets are installed in the "age hardened" condition and do not require refrigeration after heat treatment.

Both in shear and tension, these rivets develop values which are approximately the equivalent of driven rivets, the type now most widely used.

The new rivets are safe and may be used without fear of serious injury. However, they should be handled with reasonable care. Numerous safety tests have indicated they will not detonate in mass and are quite insensitive to shock and friction. As would be expected, fire or high heat of any kind will cause them to expand.

Those who have been close to the work feel the development will be increasingly helpful in solving many aircraft production problems. Already several million explosive rivets have been sold and are in service in American airplanes.

In addition to their use in aircraft, it is believed these rivets may find many applications in other industries. Manufacture in still larger sizes and in other metals including steel does not seem beyond the realm of possibility as now viewed. Time alone will develop the full picture.

New Encyclopedia of Machine Shop Practice

■ *New Encyclopedia of Machine Shop Practice*, edited by George W. Barnwell, professor of production practice, Stevens Institute of Technology; cloth, 576 pages, 5¼ x 8⅜ inches; published by Wm. H. Wise & Co., Inc., New York, for $1.98.

Inspired by the needs of untold thousands of new workers in the metal trades now being drawn into machine shops throughout the country by the national defense program, this book itself is an interesting example of what can be accomplished through mass production. Under ordinary circumstances a technical book of this kind would have to sell for two or three times the price charged for this one, because of the limited number ordinarily published. In this case, however, the first edition runs to 300,000 copies, thus bringing the unit cost down.

Recent changes in machine shop practice due to improved machines, materials, etc., have rendered obsolete shop handbooks of only a few years ago. Being thoroughly familiar with this condition, Professor Barnwell and his collaborators—including such authorities as Frank W. Curtis, president, American Society of Tool Engineers—built this book from the bottom up on a foundation of the latest techniques. Nearly 1000 illustrations augment the text, and like the text they cover the latest developments.

The book carries through all the way from simple bench work to advanced measuring and testing. Other general subjects covered are: Lathe operations (including turret lathe and automatic work); milling; punching and stamping; heat treatment and welding; forging and foundry practice; machine drafting. A 36-page appendix is devoted to data and tables useful in the shop. The book is unusually well indexed, which is important in view of the fact that nearly 3000 items are dealt with.

Without attempting over-simplifications, those who compiled this book have succeeded to an unusual degree in making it readily understandable to anyone of average intelligence who has had a fair education (say one year in high school) and who has any liking for matters mechanical. To any person of such qualifications—and any degree of ambition to "get on" in the shop—this book can, without any question, be of tremendous help. It will be useful both for home study and as a reference handbook in the tool kit on the job.

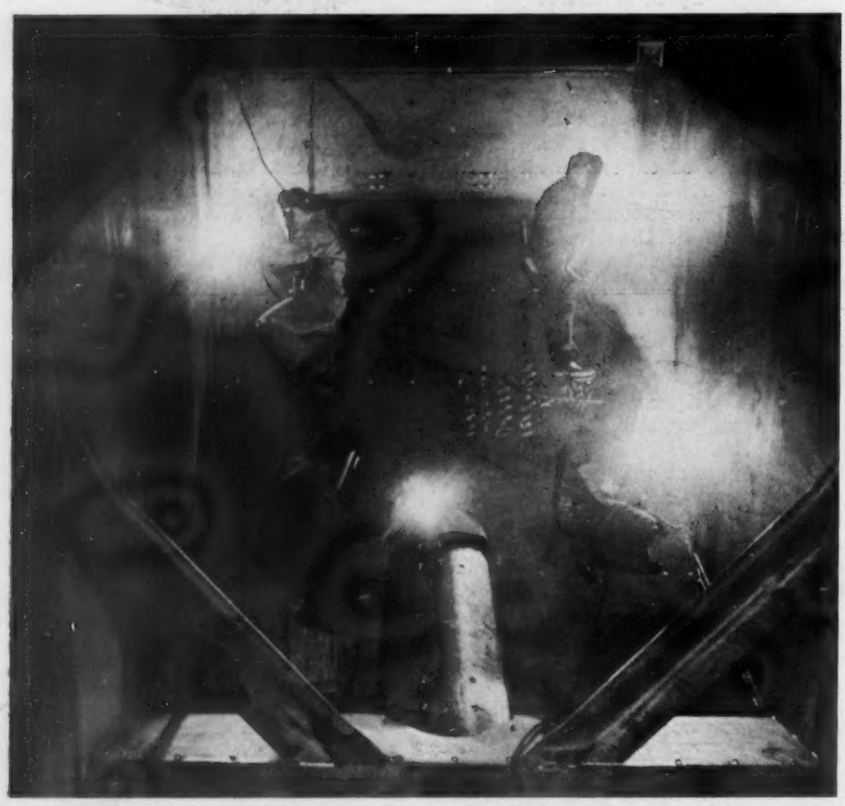
White-Base Antifriction Metals Output Doubled

■ Almost twice as much white-base antifriction bearing metals were produced by 38 selected manufacturers during the first half of this year than in the first six months of 1940, the Census Bureau reports.

Output during the first six months of this year by these manufacturers totaled 20,335,679 pounds, compared with 11,579,410 pounds for the corresponding period of last year.

Production for the entire industry during the first six months of this year was 34,029,491 pounds compared with 20,460,981 pounds for the first half of 1940.

Constructing Steel Coal Cars by Arc Welding



■ Above are several of 15 General Electric 300-ampere arc welders which play an important part in the construction and repair of all-steel coal cars of 50-ton capacity at the Reading Co. Shops, Reading, Pa. Arc welding is used exclusively in the fabrication of under-frame, bolster and other assemblies. The company is now building 1500 of these cars for its own use, assembling 32 at a time in its shop, and completing 8 cars a day

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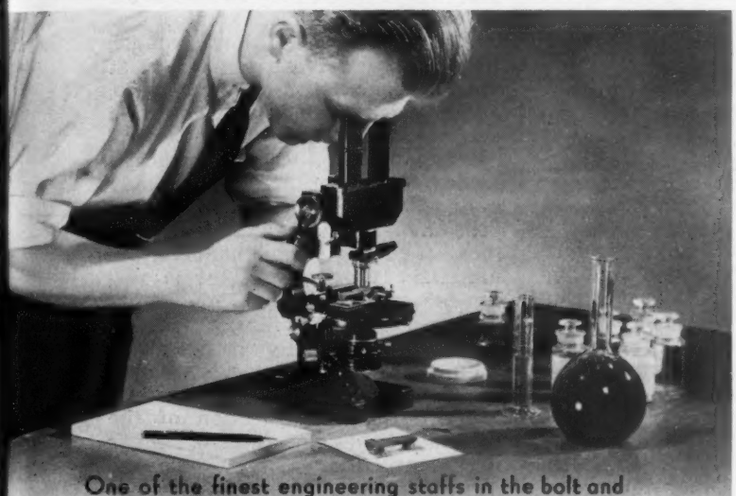

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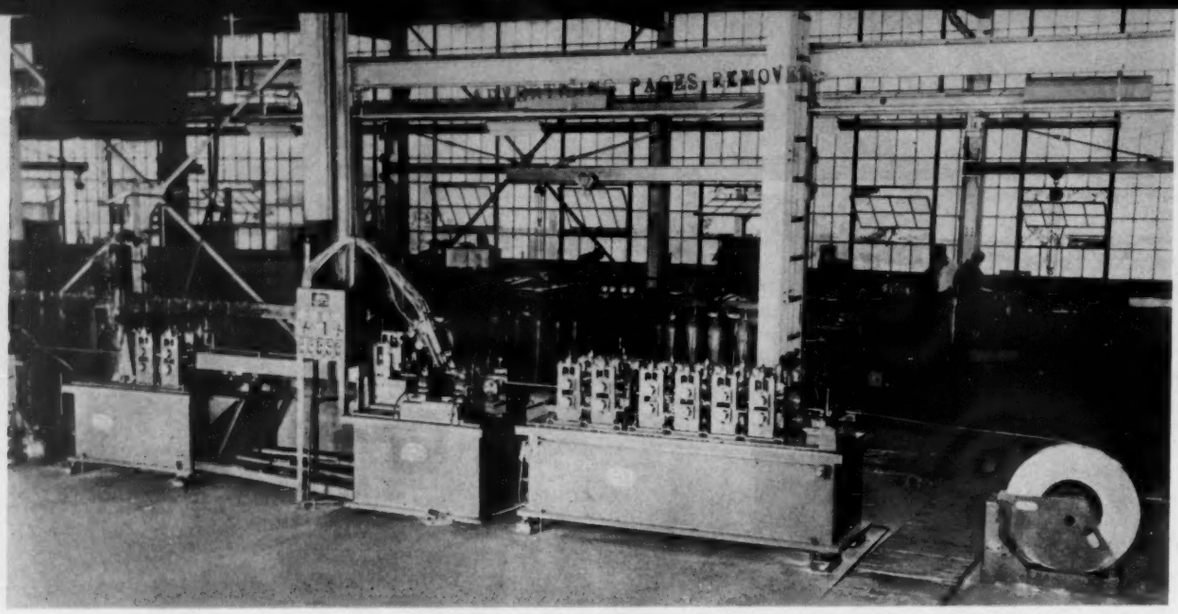


Fig. 1—Flat steel skelp is fed into this machine, automatically formed into tubing and oxyacetylene welded at exceptionally high speeds

GAS-WELDING MACHINE

produces stainless steel tubing

Newly developed unit handles various grades of skelp from 30 to 150 feet per minute depending upon the gage. New welding head reduces gas consumption. Crushing and diameter expansion have no effect on welded portion. Various steps in the process are described

■ TUBING can now be continuously welded from low-carbon, stainless and other alloy steel skelp at exceptionally high production speeds with a new automatic oxyacetylene tube-welding machine. This machine contains many new features which result in lowered operating costs. It was developed by the Yoder Co., Cleveland, in collaboration with The Linde Air Products Co., New York.

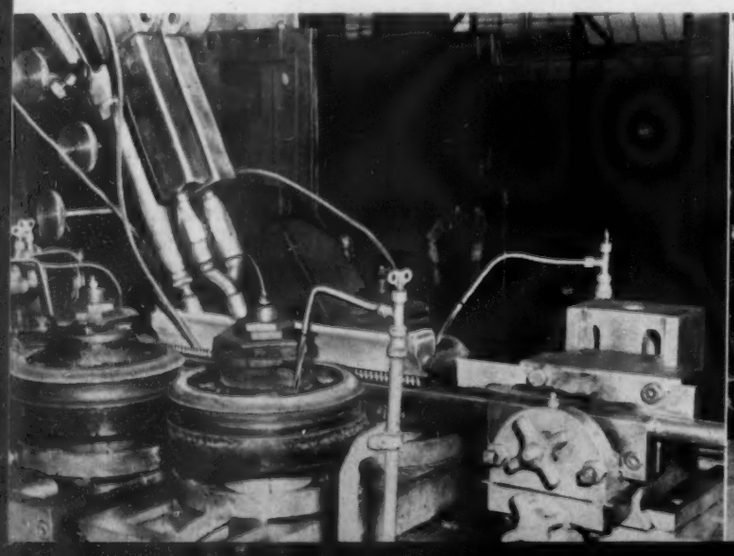
Oxyacetylene welding provides a high-speed method of welding stainless steel tubing with uniformly good quality welds. Now with this new machine it becomes possible to produce high-quality, continuously welded stainless steel tubing at low production cost. The gas welding method is also unique in that it can successfully produce tubing from unpickled, hot-rolled stock for which there is considerable demand in the manufacture of low-cost items such as automotive exhaust tubing, conduit tubing, and structural tubing on which a smooth, polished finish is not necessary. Other tube-welding methods have not proved satisfactory on this type of material.

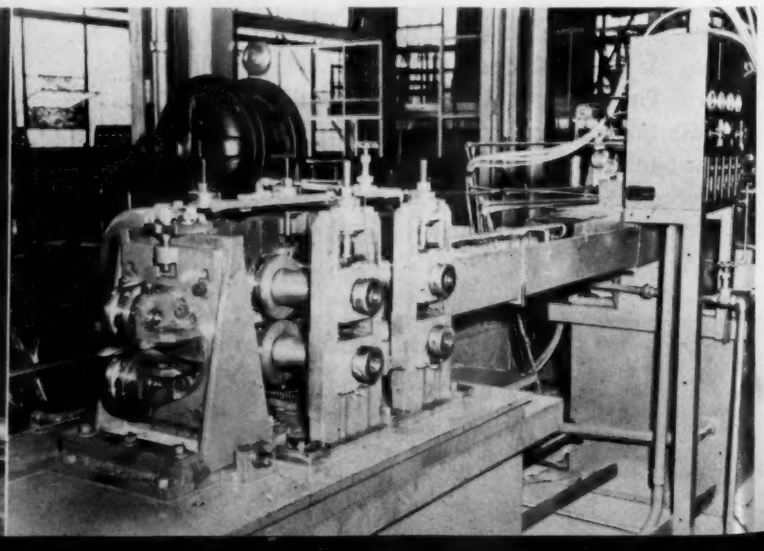
The cost of oxyacetylene welding of cold-rolled, low-carbon steel tubing compares favorably with operating costs of other methods of welding steel tubing. However, the oxyacetylene method now offers the additional advantage of greater possible welding speeds. For example, 18-gage material can be welded at speeds up to 150 feet per minute, and heavier materials at comparable speeds, as indicated in the accompanying table. Since the oxyacetylene weld is continuous, the only limit to the welding rate is that imposed by such mechanical factors as those of cutting off and handling the material. Consequently, it is reasonable to assume that further developments on handling these factors will eventually bring about even greater oxyacetylene welding speeds.

The forming-mill section of the new tube-welding machine is similar in construction to previously designed tube-welding machines. The flat skelp is fed in from a coil through a series of forming stands

Fig. 2 (Left)—Tubing is welded by a combination of intense heat from a multi-flame welding head and pressure exerted by four guide rolls

Fig. 3 (Right)—After welding, the tubing passes through a water quench trough and between a set of straightening rolls and then is cut to length





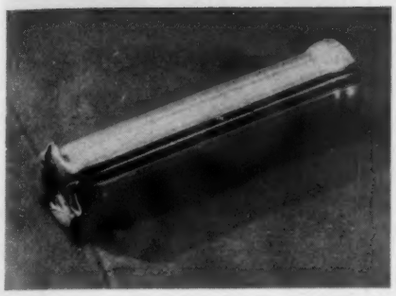


Fig. 4 (Left)—Welded tubing as produced. The slight welded reinforcement usually is removed with a cutting tool mounted a short distance from the welding flames. Weld withstood crushing at one end and diameter expansion at the other end without failure

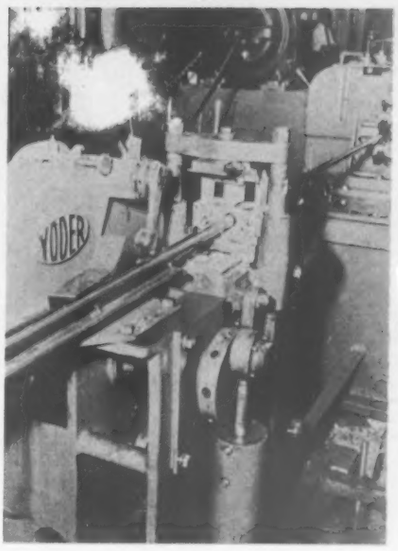


Fig. 5 (Right)—Automatically operated shear which cuts the tubing to desired lengths following the cooling and straightening operations

powered through a worm-gear mechanism which assures an even feeding action at exceptionally high speeds.

The welding table section of the machine contains several new features which make possible the high speed of welding. Heat is supplied from a new type multiple-flame Oxweld duplex welding head which requires 2 to 30 per cent less acetylene per foot of weld, and 5 to 10 per cent less oxygen per foot of weld than welding heads previously used. Separate oxyacetylene supply lines are provided for the welding and for the preheat flames. The supply of these gases is automatically controlled through new-type regulators which are extremely sensible and provide steady working gas pressures. Regulator adjustments are made at a conveniently located control panel. Provision is also made at the panel for push-button control of the welding blowpipe and the drive mechanism of the machine.

The development of this new machine with its capacity for unusually high welding speeds adds considerably to the advantages of the oxyacetylene method of welding tubing.

1. Welding Rates Are Faster—Tubing can be oxyacetylene welded at speeds ranging from 30 to 150 feet per minute, depending upon the thickness of material.

2. Cost is Less—Actual operating cost per foot of oxyacetylene welded tubing is comparable to those of other methods, but the cost of the complete oxyacetylene welding installation is less than that of installations required for the application of other methods of continuous tube welding.

3. Stainless Steel Can Be Welded—Tubing of stainless steel can now be welded by the oxyacetylene method at speeds in excess of 50 feet per minute.

4. Unpickled Steel Can Be Welded—All that is necessary to produce maximum-quality welds in tubing formed from unpickled, hot-rolled stock is a slight increase in the unit consumption of both oxygen and acetylene over gas quantities required for cold-rolled steel.

5. Process is Versatile—In addition to plain carbon cold-rolled and hot-rolled steels, and stainless steel, the new oxyacetylene tube-welding machine will successfully handle a wide variety of alloy steels. Since one tube-welding machine can turn out over 12,000,000 feet of tubing per year, the additional versatility of the oxyacetylene welding unit makes it possible for the manufacturer to spread his depreciation cost over a larger variety and a larger volume of products with resulting lower costs for each.

Table Of Operating Speeds

Wall thickness B. w. g.	Speed range Ft. per min.
14	30 to 100
16	40 to 140
18	60 to 150
20	100*

*This value limited by mechanical facilities for controlling the lightweight skelp.

Paint Kills Corona in High-Voltage Machines

■ By treating the end-turn insulation of high-voltage machines with Coronox, a new semiconducting paint, corona can be eliminated according to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A single proper resistance value, such as the 10 megohms per square inch resistivity of Coronox, states the company, can reduce the voltage stress across the end turn insulation sufficiently to eliminate this troublesome element.

In treating the stator coils, glass binder tape is completely filled with Coronox, providing a thick, firmly anchored, semiconducting layer on the surface of the coil. The parallel connecting rings and support rings are treated in a similar manner. Then a long-life insulating varnish is sprayed over the whole end winding to protect the Coronox and increase its stability.

Two often measured properties of electrical insulation are the flashover voltage and the breakdown voltage. The flashover voltage of Coronox-covered surfaces, according to the company, is actually greater than that of highly insulating surfaces. The breakdown voltages for treated coils should be higher than for untreated coils because the Coronox treatment eliminates concentrated voltage stresses at the edge of the slot.

Slide-Rule Selector Aids Compressor Engineer

■ A new air-compressor selector designed to aid in selecting the correct size and type of compressor for a specific job in one simple setting is announced by Quincy Compressor Co., Quincy, Ill.

Functioning like a slide rule, it shows correct compressor model number, free air delivery, revolutions per minute, piston displacement and motor horsepower required. It also contains figures for making allowances for loss in free air delivery at high altitudes. Pressures covered by the selector range from 30 to 250 pounds. It is offered gratis to those writing to the company.

Issues Revised Sheets For Data Book

■ International Nickel Co. Inc., 67 Wall street, New York, has issued several revised sheets to be included in the data book entitled "Nickel Alloy Steels" which it circulated in the industry.

Subjects embodied include "Structural Nickel Alloy Steels," "Nickel in Nitriding Steels," "Properties of Nickel Alloy Steels at Low Temperatures," "Definitions of Terms Relating to Heat Treatment," "Case Hardening of Nickel Alloy Steels," "Foreword" and Table of Contents. The new sheets should be inserted as substitutions for present sheets and the latter destroyed.

Fig. 1—At left is shown how the plain flat pallet is adapted for multiple transport by using removable corner posts, for easy handling of formed parts. Fig. 2 at right shows welded steel racks made for handling sheet metal parts only. The shelves are removable and so can be adjusted to height desired

MATERIALS HANDLING METHODS

. . . . developed by General Electric's Bloomfield plant embody some unusual features detailed in the article below

By J. G. MAUTHE
Planning Department
Bloomfield Works
General Electric Co.

■ IN THE layout and materials handling phase of plant operation, it is almost an established principle that nothing is where you want it or where it finally will be placed. Therefore, governing factors in planning a handling system are usually high or low production, economics and simplicity of design of handling equipment. Mechanization, where possible, also is a first consideration.

Although there are no high-production setups at the Bloomfield, N. J., plant with all of the attendant equipment necessary, high-production materials handling methods are simulated in the manufacture, assembly and shipment of our air conditioners. These units are made in many models with wide differences in production. If a typical room cooler is followed through the various stages, it will afford a representative picture of our procedure as it affects all air-conditioning units.

In production of these units, there are several setups such as: Manufacturing of heating and cooling coils; receiving materials from other plants; manufacturing of sheet metals; assembly test; and shipment.

The manufacture of heating and cooling coils presents very little that is new in handling. Pallets deliver the coils of copper and the tubes to the stock area. This area is equipped with monorail and hoist to service punch presses where blanking of fins takes place. These fins then are assembled to tubes by means of a stacking machine. The job next goes to the automatic solder pushing machine and then to the solder bonder. All of these machines are close to each other, and work flows from one to another with a minimum of handling.

The coils are now bonded and ready for assembly. They are placed on skids and delivered to their particular coil assembly where return bend, manifolds, and the like are silver brazed to the coils. Next, the assembled coil is placed on a monorail which delivers it to test, and thence on a roller conveyor to the painting room for the dip operation.

When the production line was first set up, a bit of a problem was encountered at this point. Using an air-dry paint on these units for protective purposes called for a plain drying rack for the units of the coils. But the actual drying time took much longer than was anticipated, and it looked as though the dipping operation was going to be a serious bottleneck.

This problem was solved by putting wheels on the old draining bars so that the rack could be moved along in between a double row of tracks. After a barful of coils finishes draining over the paint tanks, it is placed on the track and is pushed along as each succeeding bar finishes draining. This arrangement speeded up things considerably, and brought the completely assembled coil right out in the main assembly line ready for incorporation into the room cooler.

Handling Incoming Materials: Adjacent to the assembly line is an assigned stock area where parts manufactured in other General Electric plants for use here are received. These parts arrive packed into a compact load unit steel strapped on returnable pallets.

The load is then transferred from the cars to the stock area and to the assembly line by fork or hand pallet trucks. For use of pallets and economies afforded, see other articles on practice in General Electric plants, STEEL, June 12, 1939, p. 52; Oct. 7, 1940, p. 53; Dec. 9, 1940, p. 60; and Dec. 16, 1940, p. 76.

Sheet Metal Manufacturing: Early this year, the layout of the sheet metal department was changed over to handle all materials through the different operations with fork trucks. Die changes also are now being handled this way.

The layout covers about 24,000

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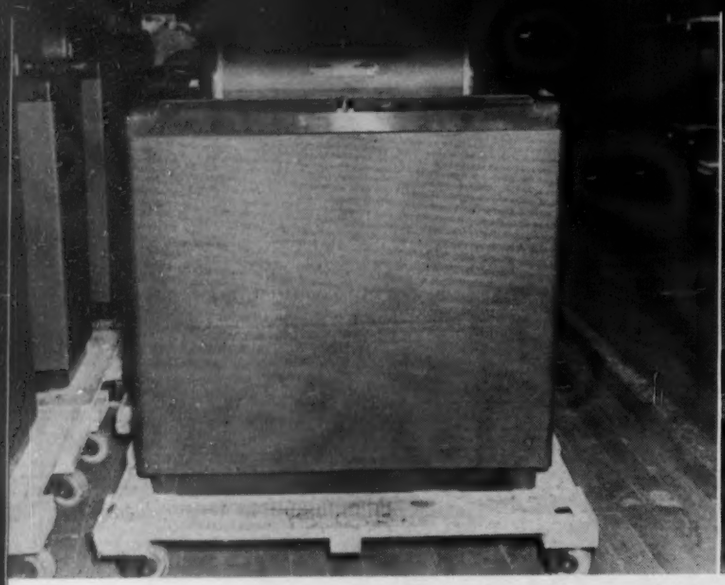


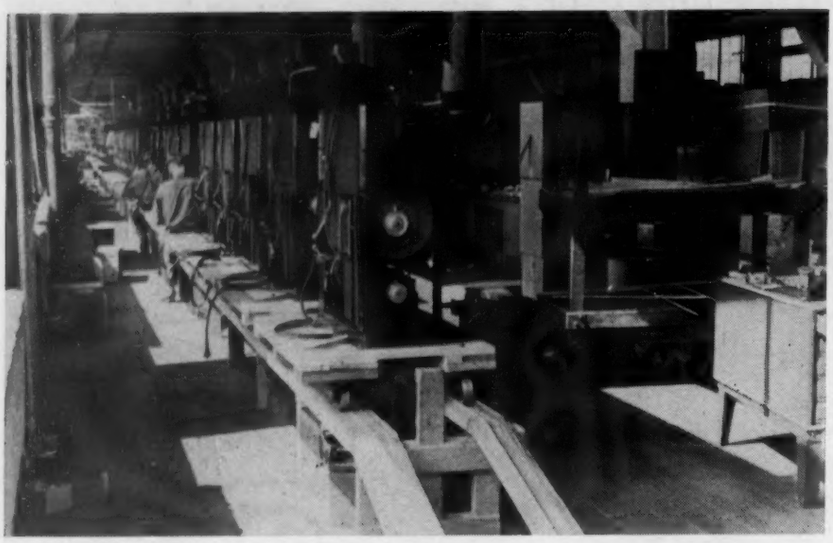


Fig. 3. (Left)—This is the assembly line for the FB70 air-conditioning unit. Here are employed the removable casters that are placed in what becomes the crate bottom and on which the assembly is built up. The wheels of the casters ride in guides on the raised track, thus keeping them in line

Fig. 4. (Above Left)—Now the Type FB70 air conditioner has been encased completely and is ready for packing. Note it still is on the removable casters

Fig. 5. (Above Right)—Packing case is built around the same base on which unit was assembled as shown above. As the fork truck lifts the unit to take it to the shipping floor, the casters drop off as shown here. Casters are then reused. Their life in this service is much longer than might be expected

square feet and the equipment served by fork trucks includes: three power shears of 6-foot, 10-foot and 12-foot capacity; 16 power presses of varying sizes; seven power brakes from 4 to 10 feet in size; seven projection and spot welders; and two power rolls. At the finishing end are a degreaser, spray booths, and an oven serviced by a power conveyor, the latter using 468 chains with a transfer after spraying to a bar-type straight-through oven chain.

Sheet steel used in this department is ordered in bundles of 4000 pounds maximum weight. The largest size handled is 54 x 126-inch, with some sheets 60 inches wide but not quite as long. The largest run of any part in the flat is in quantities of 1000 pieces, the quantity being decreased to 200 pieces as the sizes get larger. These quantities are necessarily again decreased as they come off the brakes, forming dies, and rolls where size begins to bulk up. The long sheets are serviced to the shears by fork trucks which have an extra front plate so as to give a wider spread for the forks. The trucks also have a pair of 12-inch extensions for the standard 42-inch fork length that has been found best suited to our aisles.

From the shears, the parts are next placed on our standard pallet, 42 inches wide by 48 inches long, and delivered to the next and succeeding operations. The truck finally places them on one of two steel benches, readily accessible to an operator who works from one bench to the other.

Rack Sometimes Used

This handling system works out exceptionally well in the flat and in some cases with the sheets after they are formed. In quite a few instances, however, it is necessary to use racks. For this purpose, we designed a rack, perhaps a composite of all the racks we had ever seen. Of the same base size as our pallets, this rack is 57 inches high inside and made for fork truck use only. The bottom is made of 3/16-inch stock with six 2-inch square tubes of ⅛-inch stock for side supports, tied in at the top with 1½ x 2½-inch angle, open at the front, with two small gussets in the rear corners. Spaced along the sides and back are 1-inch straps, 4 inches apart, for adjustable shelves.

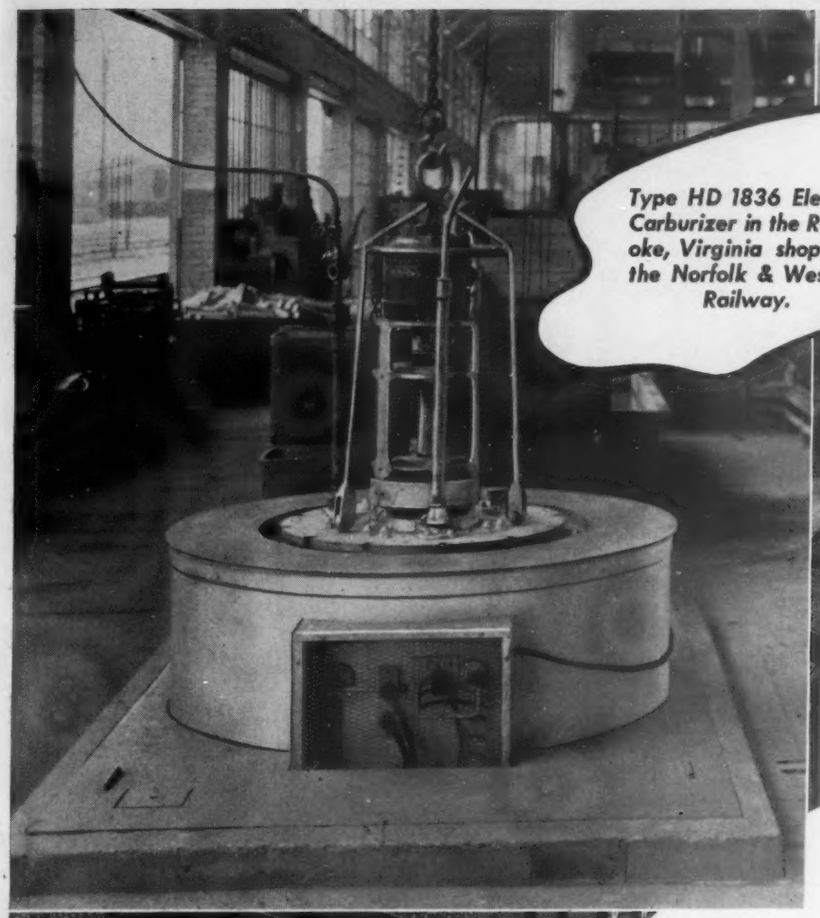
A special arrangement of the base, with the lower leg longer than the upper, enables us to stack the racks and run with them, eliminating the danger of their sliding off because of vibration. Parts are handled thus right up to the cleaning and painting operation.

At this point, there is another finished part on our hands ready for the assembly line several hundred feet away in another building. Fork trucks are again called upon to do the handling job. Some of the parts are transported with the above mentioned rack. For others, the plain pallets have been fitted with pegs so that the parts will not touch each other; on these there are removable posts on the corners so that three pallet loads can be handled at once. Neither of the above methods is suitable for a few odd shapes, so these are transported in cartons.

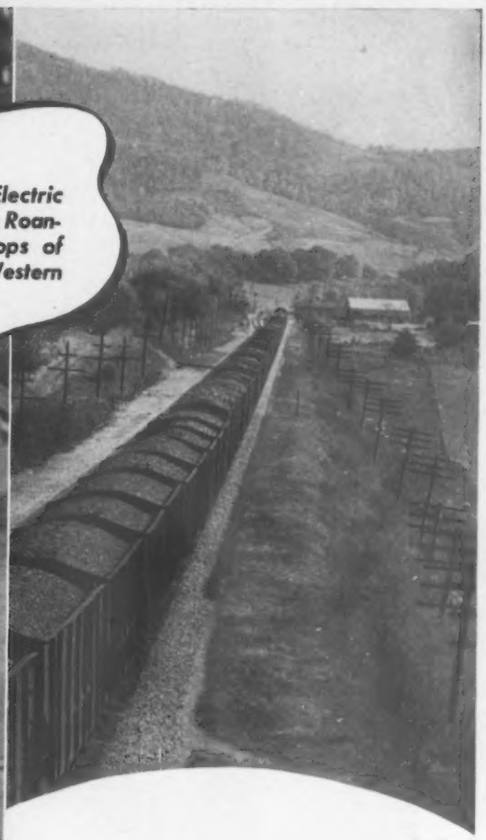
Due to the above precautions, handling costs in this department have been lowered considerably, and the parts reach the assembly floor in excellent condition. Only a very few repair or repaint jobs are chargeable to handling in transport.

Assembly: Ordinarily an assembly

(*Please turn to Page* 102)



Type HD 1836 Electric Carburizer in the Roanoke, Virginia shops of the Norfolk & Western Railway.



N & W *and* HEVI DUTY *furnaces*

Among important Hevi Duty Electric Furnaces in the Roanoke Shops of the Norfolk & Western Railway is the Hevi Duty Electric Carburizer used for carburizing pins and bushings in car construction. Quality and economy were important factors considered in their choice of this equipment.

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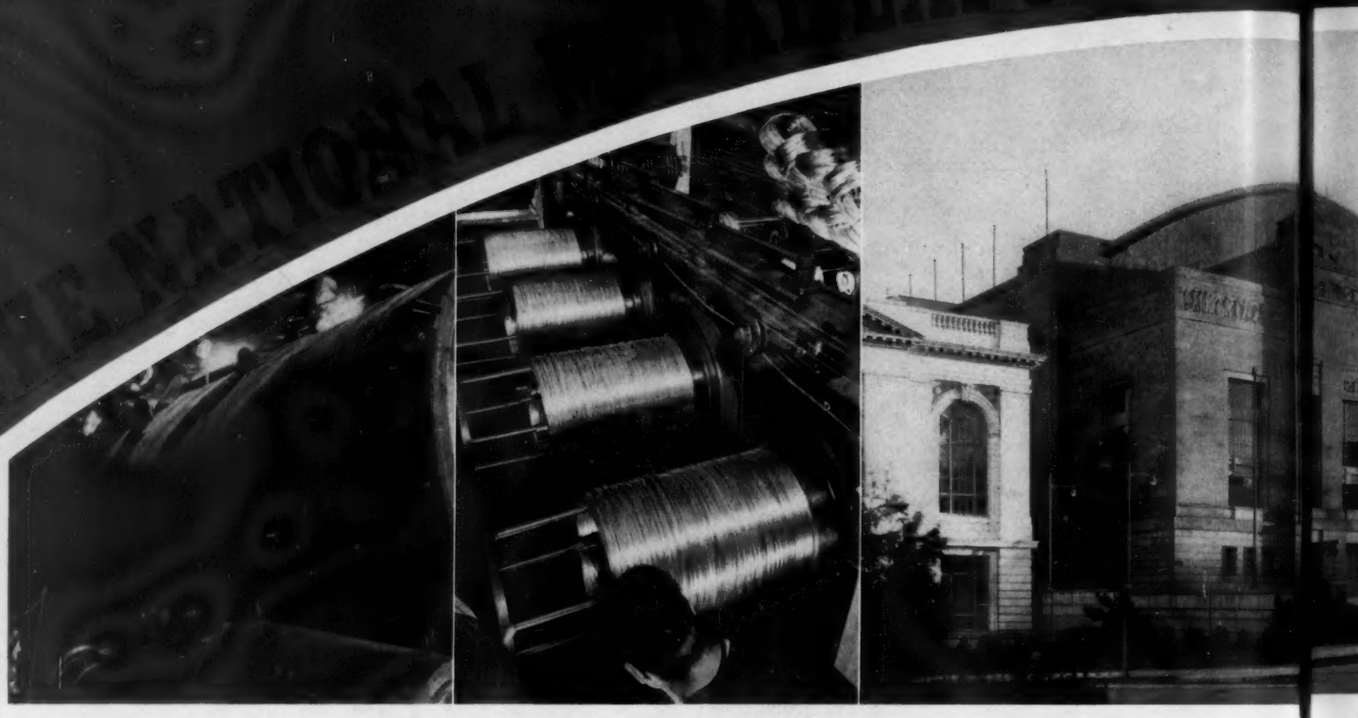
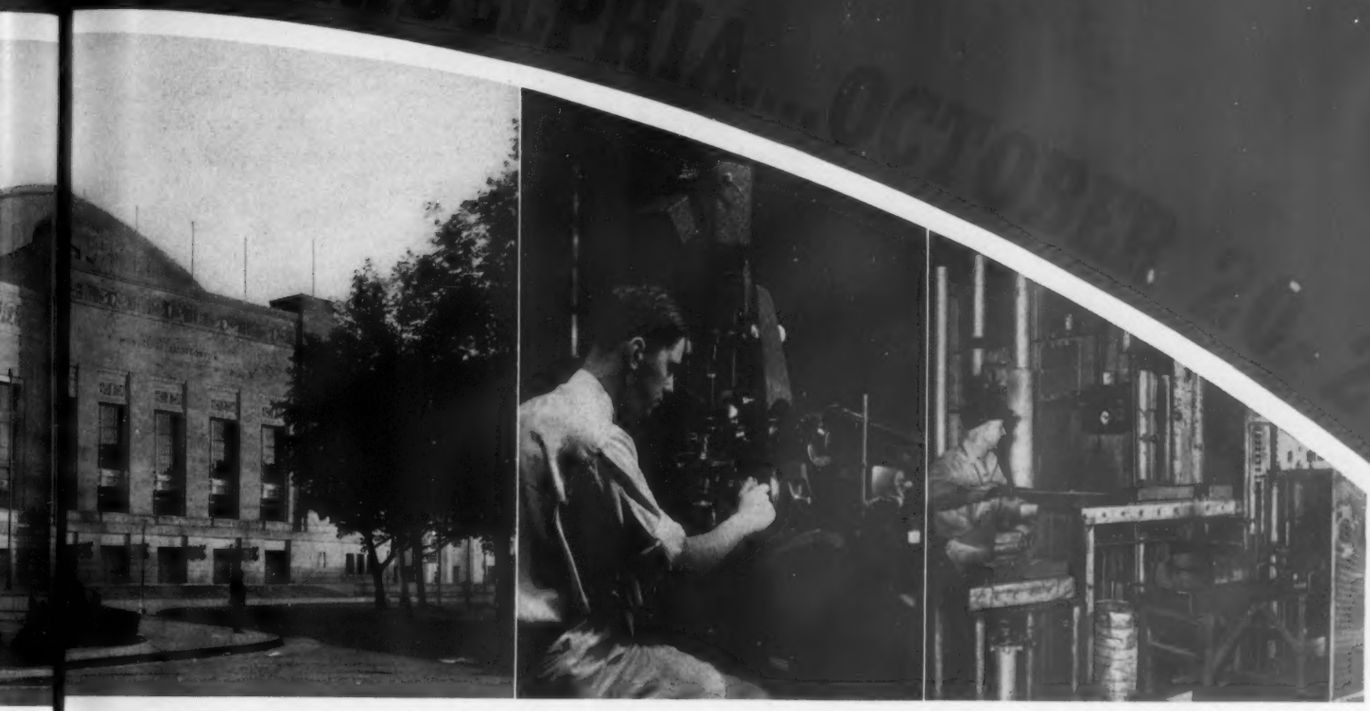


DEFENSE is the major problem of the metal producing and metalworking industries today. And, because of so many defense problems, the men working with metals are going to find it expedient and necessary to attend the twenty-third annual National Metal Congress and Exposition in Philadelphia's Public Auditorium, October 20-24. In no other way can such a fund of information be accumulated in so brief a time.

THE METAL SHOW this year will offer the opportunity for executives in defense industries to learn of new equipment, materials and processes with the least expenditure of time. The exhibits and the technical programs will offer many ideas and suggestions for speeding defense work. The 1941 Metal Show will undoubtedly attract many more than the 35,000 important visitors who attended the 1940 show. It will be very much worth while to make definite plans to attend this convention and exposition.



STEEL as over the past many years, will devote a substantial portion of the October 13 issue to the same interests as the various Societies participating in the National Metal Congress. This issue will carry a combination editorial and advertising insert section printed in red and black on special coated stock. Editorially, it will carry the complete technical program; the entire list of exhibitors, who will be in attendance, their booth location and what they will exhibit; as well as other pertinent information.

ADVERTISING in this issue, in combination with the editorial material, will give the convention visitor a fore-taste of what he will see and hear—just a week prior to the opening of the show—and it will display your products to those who attend as well as those who do not. Companies selling to the metal producing and metalworking industries may well consider the advertising possibilities of this issue. Write for details.

STEEL

PENTON BUILDING CLEVELAND

Metal Protective

FINISHES

Painting tanks and pumping station stacks involves difficulties of application. Constant supervision is required to obtain good results

While many developments have been made in new finishes, the principles of protecting metal surfaces remain confined to those few here emphasized by Mr. Meacham in a brief review of how to protect metal surfaces in the light of the newly developed coatings available

By J. A. MEACHAM
Manager, Maintenance Division
Sherwin-Williams Co.

RED LEAD, lead chromate, zinc chromate and blue lead pigments have shown that they do retard and inhibit corrosion. Therefore, as a preliminary step, every metal surface should be coated with an inhibitive primer of this type. The finish coats applied over the primer must protect the primer and, therefore, must be essentially resistant to the destructive influence of weather, sunlight and such fumes as may be present.

Paint vehicles using synthetic resins have greatly increased water resistance, hasten drying, make harder and tougher finishes, and materially improve the appearance of outside paints by enabling them to retain their gloss for longer periods of time. Synthetic vehicles are used on metal surfaces both in primers and finish coats, for normal outdoor or indoor exposures as well as for severe fume conditions.

In general, alkyd synthetic finishes perform best out of doors on metal, since they have the ability to retain their gloss under sunlight and have outstanding weather durability. Phenolic synthetic vehicles are selected for a maximum resistance to acids, alkalis, and moisture. The desired pigment combinations may be used in both types of synthetic vehicles.

How Thick a Film? It can be demonstrated that the ability of a paint film to resist the passage of water is in direct proportion to the film thickness. More and more we are coming to believe that a greater total thickness of paint increases the protection afforded. For this reason, the application characteristics of a paint are important. It must apply readily so the operator can produce a full, uniform coat on all parts of the structure. If the paint pulls unduly, the result is uneven distribution with too much paint on one part of the surface; too little on another. If the paint is too thin, it flows out into a thin film which does not give the required protection. If it dries too slowly, the film may be injured in handling.

With paints of proper consistency, as many as four coats are now being recommended for new work on important structures, usually consisting of two priming coats and two finishing coats. One priming coat is applied in the shop; a second coat of primer in the field after erection. This covers any skips in the first shop coat or abrasions caused in transit. The two additional finish coats then afford the necessary protection for the primers. Of course, good protection can be achieved with 3-coat work, that is, one primer and two field coats.

Aluminum paint with properly selected vehicles gives good results over an inhibitive primer. The individual flakes of aluminum overlap in horizontal layers, increasing the distance that moisture must travel from the outer surface to reach the steel. This, in effect, increases the net thickness of the film.

Preparation of Surfaces: No phase of metal protection with paint is more important than surface preparation. Rust, mill scale and foreign material must be removed before painting. Mill scale is an oxide of iron, formed on the surface in the process of rolling. If it were a continuous film, firmly adherent at all points, it would of itself be an excellent protection against further oxidation. But it is not continuous and numerous weak

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spots permit moisture to enter so rusting takes place under the scale, eventually forcing off both the scale itself and the paint which is applied over it. Complete removal of all loose mill scale is necessary either by pickling, sand-blasting, wire brushing, weathering, chemical treatment and flame cleaning. At least that which is not tightly adherent to the metal must be so removed.

Of course, pickling is hardly practicable for structural steel work, being confined to work easily handled.

Sand blasting is effective but has the disadvantage of making the exposed steel likely to corrode very rapidly, so it must be painted immediately.

Wire brushing by hand or power driven brushes will remove loose scale. If the work is well done, this is a satisfactory means of preparing steel for painting. Leaving the steel exposed to the weather for considerable periods of time will remove the scale but a coat of red rust develops, so is not satisfactory.

Phosphoric acid treatments convert the steel surface into a deposit of iron phosphate which destroys existing rust and passifies the surface so that further rust does not form easily.

Under closely controlled conditions, as for example in a shop on a manufactured product, this method is highly effective. In structural steel work, it is easy for excessive quantities of the phosphoric acid to accumulate in pools and crevices. Applying paint over such areas invites trouble.

Flame cleaning is a very recent development. Small, brush-like flames are moved over the surface and it is claimed that the heat drives out moisture and loosens mill scale effectively. This method offers excellent possibilities. For preparing a previously painted structure with steel heavily corroded, sand blasting is the best practical method.

Finishing Machinery and Equipment: For finishing machinery and equipment inside the plant use an inhibitive type of primer, such as lead or zinc chromate. Synthetic enamels make it possible to obtain beautiful finishes in a wide selection of colors with fine covering ability. They will dry quickly, flow into a smooth gloss or egg-shell finish, as desired, and are highly durable. Special synthetic enamels of the phenolic type are available where chlorine and other chemical fumes create exceptionally severe conditions.

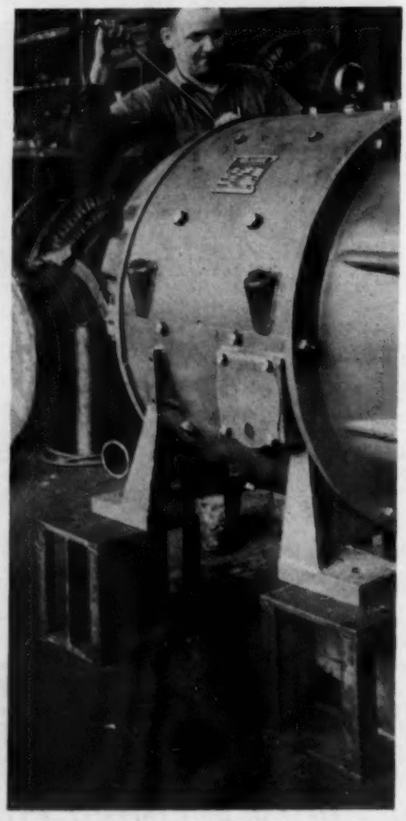
For certain metal surfaces largely hidden from view and not requiring paint for decoration, economical protection can be given by applying low cost bituminous paints frequently without the use of primers. These paints are black or very dark in color and do not present an attractive appearance but they do afford excellent protection at reasonably low cost.

While much progress has been made, a few fundamentals continue to be of outstanding importance: The use of rust inhibitive chromate pigments for the priming coats; improved synthetic finishes; adequate film thickness; proper preparation of surfaces. These are the foundation stones for success in protection of metal surfaces wherever they may be found.

Steel Blocks Quicken Motor Assembly

■ To be able to work freely on all sides of a motor is particularly important in assembly operations. In fact, eliminating the number of moving operations automatically reduces possibilities of damage to either the man or the machine. When, as in the plant of Reliance Electric & Engineering Co., Cleveland, many of the motors being built are larger and heavier than can be handled without the aid of chain lifts or cranes, the time that can be wasted in shifting them around can add up to a considerable amount. Both the assembly and handling operations in the plant have been facilitated by the use of steel blocks. Here, once the motors are "spotted" on the blocks, there is plenty of room on all sides for assembly without further shifting about of the machines.

The largest motors, those of several hundred horsepower, are high enough to be assembled on the floor without supports. Smaller motors, but still of good size, running in weight from a few hundred pounds to as much as 10 or 12 thousand pounds, are placed atop one or even two rows of steel blocks, depending on which working level is better for expediting the work. Generally, the medium-sized motors are assembled on a single height of blocks and the small motors on the double height arrangement.



Assembly operations on this force-ventilated direct-current motor, "spotted" on four 12 x 12-inch steel blocks, can be carried on freely on all sides without further moving about of the 11,500-pound unit

The steel blocks are 12 inches square, made from I-beams. Light angles are welded in the four corners of each section of I-beam to give it uniform rigidity and to facilitate its handling. The blocks are light enough to be lifted and arranged safely and easily by hand.

Approve Practice For Nonferrous Boilers

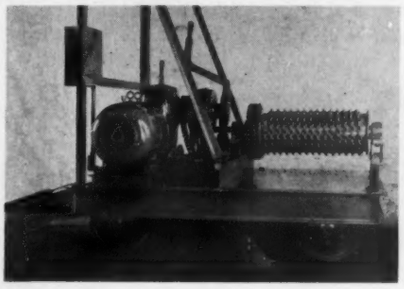
■ Simplified practice recommendation for nonferrous range boilers, recently proposed as a means of conserving nonferrous metals by reducing unnecessary inventories of boilers, has been accorded the required degree of acceptance, and has been approved for promulgation as of July 1, 1941, according to the National Bureau of Standards, Department of Commerce, Washington.

The recommendation proposes the adoption of a simplified list of six stock sizes, ranging in capacity from 30 to 100 gallons, each to be made in three working pressures and two styles, making a total of 36 varieties, which it is believed, will satisfactorily meet a large majority of normal requirements.

Everyone in any way concerned with the production, distribution, or use of nonferrous range boilers is urged to adhere to the recommendation, which is identified as R181-41. Until printed copies are available, mimeographed copies may be obtained without charge.

Motor-Driven Fan Puller

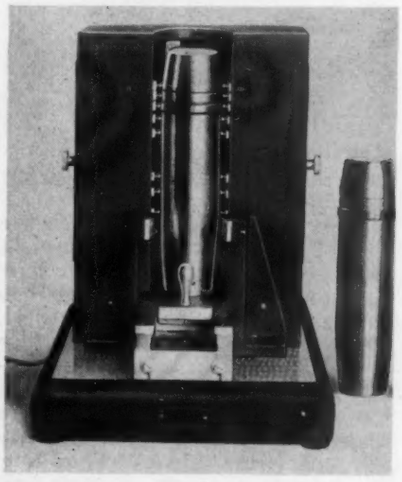
■ J-B Engineering Sales Co., New Haven, Conn., has introduced a new Mansaver motor-driven pan puller capable of serving two rows of furnaces. Operating on a track between the furnaces, the car is controlled by a separate operator. When the pan puller has been spotted in front of



the furnace, the operator, by reversing the motor permits the furnace man to run the chain to the furnace for attachment to the pan. The operator then pulls the pan out. The car runs on a narrow gage track. In the foreground of the illustration is shown a latch which is designed to travel along over the track gripping it when the pan is being pulled out of the furnace. This prevents the car from overturning. A clutch is used to transmit motion from the motor to the winch or to the car wheel.

Electric Contact Gage

■ Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn., announces a multiple electric contact gage for checking several dimensions simultaneously. It informs the inspector instantly, by pairs of green and red lights, if any section is too small, too large or within specified limits. The illus-



tration shows the gage used in connection with shell. It receives and rejects the shell in one operation as far as its outside diameters are concerned. The gage consists of a signal box, gaging fixture and the masters. Gaging fixture is composed of a base with positioning slide or ways and a vertical column to which are attached the adjustable gaging sections. The sections, in most cases, are supported independently by parallel flat springs. In addition, each section has a fixed anvil and a movable spindle which actuates the contact arm. Tight contacts are adjustable so the diameter tolerance can be set quickly. The masters are made in sections for manufacturing purposes but are the equivalent of solid masters when assembled.

Socket and Tool Set

■ Bonney Forge & Tool Works, Allentown, Pa., has introduced a new No. TD6 socket and tool set. Sockets and attachments included are all of ⅜-inch square drive type. Containing 40 pieces, the set comes in a metal box measuring 19 x 5 x

4¼ inches. The box has removable tote tray, carrying handle, end catches and padlock hasp. The entire set weighs only 20½ pounds. Its light weight, plus the wide variety of tools included make it ideal for the automotive, aviation and industrial service mechanic.

Heat Treating Furnace

■ General Electric Co., Schenectady, N. Y., has placed on the market a new line of box-type furnaces for heat treating steel without scale or decarburization. The furnaces are for the machine tool industry and also for industries where small steel parts must be heat treated at temperatures up to 2000 degrees Fahr.

They are designed especially for use with drycolene, the company's recently announced atmosphere gas for heat treating metals without decarburization or scale. Atmospheres other than drycolene may be used, however, with the amount of scale and decarburization dependent upon the type of atmosphere used.

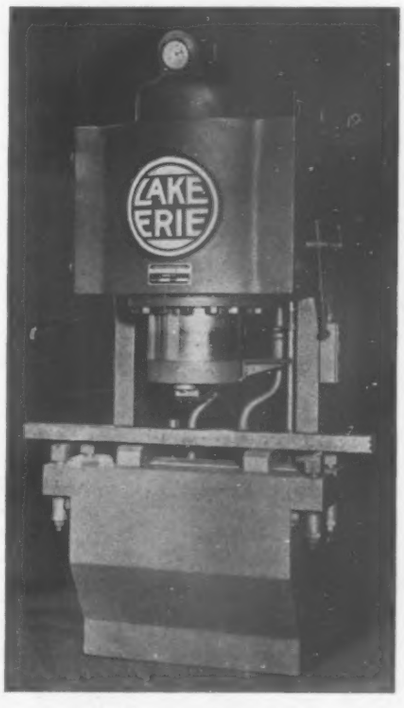
There are four furnaces in the line, three of which are similar, the fourth or largest differing in that the door is motor operated. Each furnace consists of a light-weight refractory lining backed by heat insulating material, all enclosed in a welded, gas-tight sheet-steel casing. A high-velocity flame curtain prevents the furnace from losing its atmosphere when the door is open. The gas burner is mounted at the top of the furnace throat, so that the flame curtain is shot down over the door opening eliminating the possibility of dirt dropping into and clogging the gas burner.

Uniform temperature is maintained by compensating heating units in the front and rear of the furnace, and automatically controlled power input to the main unit.

Industrial Equipment

Straightening Press

■ Lake Erie Engineering Corp., Buffalo, has placed on the market a new line of heavy duty hydraulic straightening presses. Because of the C-type frame, each press allows convenient handling of long bars. It also features fast operation with sensitive control of pressure and stroke. The bed is fitted with V blocks adjustable to suit work.

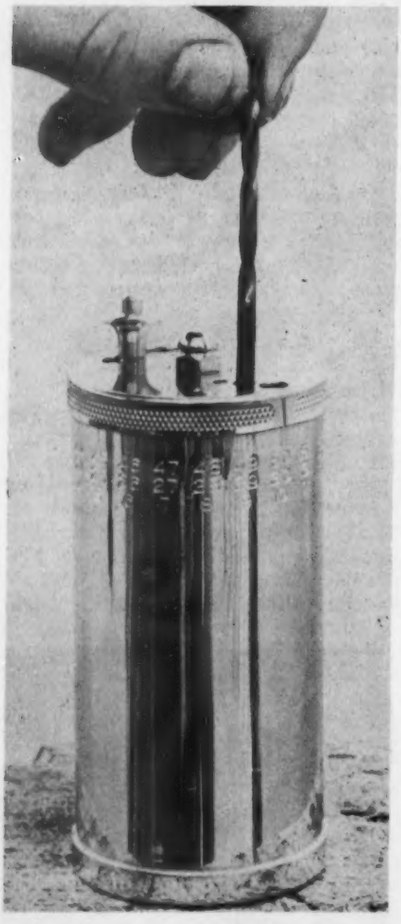


Spring rollers at the ends facilitate movement of bars. Control is affected by means of a hand lever,

operation of which determines desired pressure. A pumping unit is located at the bottom and back of the press.

Drill Container

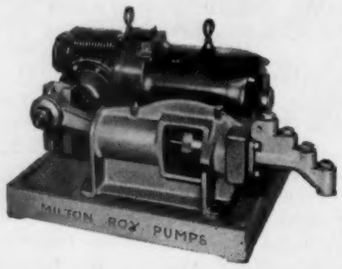
■ Burbridge & Sons, Kenosha, Wis., announce a new drill container which eliminates the usual time-wasting search through a box of drills for the proper drill size. A cylindrical case, only 5 inches high and about 2 inches in diameter, it fits any tool box and holds drills Nos. 1 to 80. Each drill, in a separate



compartment is made instantly available by turning knurled top to correct drill number.

High-Pressure Pump

■ Milton Roy Pumps, 1308 East Mermaid avenue, Philadelphia, has placed on the market a specially-built high-pressure pump for handling ethylene glycol. It has a capacity of 2.5 gallons per hour against a discharge pressure of 10,000 pounds per square inch. The entire valve construction of this pump, including chamber, piston, valve seats and ball checks is of stainless steel. This provides both corrosion resistance and the strength necessary for pumping against extreme pressures. Another feature of this pump is the combination angle gear drive, us-



ing double reduction gearing for maximum efficiency. Besides a 2-horsepower motor, the pump embodies a step-type valve with double-ball checks.

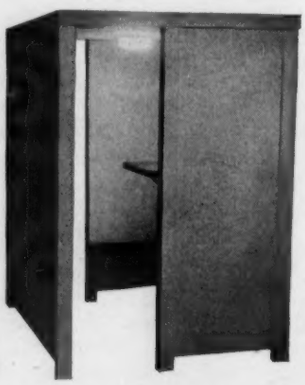
Circuit Interrupter

■ Westinghouse Electric & Mfg Co., East Pittsburgh, Pa., has introduced a new non-automatic enclosed de-ion circuit interrupter for disconnecting or interrupting of circuit in outdoor, damp, wet or dusty locations. It is available with enclosures of either cast aluminum or cast iron, both of which have an aluminized finish.

A high interrupting capacity is provided to interrupt a circuit adjusted for 5000 to 10,000 amperes depending on frame size. De-ion arc quenchers confine, divide, and extinguish arcs almost instantly as the contacts open thus prolonging contact life. Current ratings of the unit range from 50 to 600 amperes, 2 or 3 poles, at 250 to 600 volts alternating current and 125/250 to 250 volts direct current.

Conference Booth

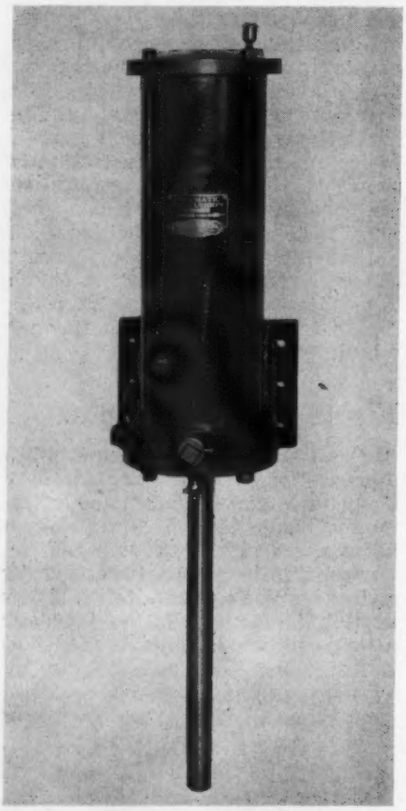
■ Burgess Battery Co., Acoustic division, 530 West Huron street, Chicago, announces a model 501 conference Acousti-Booth for use in noisy plants where a quiet conference place is necessary. Similar in construction to the telephone booth, it has walls of sound-ab-



sorbent construction to soak up factory noise. The walls blot up extraneous noise and allow persons within to carry on work without noise interference. The doorless entrance at each end permits ready access to the booth and provides ample natural ventilation. Acoustic construction of the booth makes doors unnecessary. A folding table 23½ x 24 inches and overhead electric light fixture add to its convenience. It is constructed of heavy gage steel and finished in black wrinkle finish on the exterior. On outside the booth measures 56½ inches long, 54½ inches wide and 79½ inches high.

Counterbalance Cylinder

■ Dayton Rogers Mfg. Co., 2830 Thirteenth avenue, South, Minneapolis, announces a new model GT counterbalance cylinder for large, straight-side punch press equipment. It is built to operate direct from an



air-line system, and to counterbalance the large rams on the larger straight-side presses, compensating for the increase or decrease in the size of the die tooling equipment fastened to the press ram. The compensator is regulated by a combination regulator and air-pressure gage. The counterbalance cylinders are in groups of 2, 4 or 6 and automatically take up the lost motion due to the wear of the parts and the large clutch mechanisms. These cylinders are made from 6 to 14 inches, having strokes from 12 to 24 inches. Both the steel cylinders and piston stem are hard chromium plated, preventing rusting and pitting.

The NEWS
DEFENSE EDITION

VOLUME X NUMBER X | SEPTEMBER 1941 | CLEVELAND, OHIO

NORTH AMERICAN FIRES GAS OR OIL IN SAME EQUIPMENT

FOR DIFFERENT TEMPERATURES ON SAME FURNACE

The system will burn gas during low temperature operations and oil during high temperature operations on the same furnace. This change can be made by simply opening and closing valves.

FOR DIFFERENT SEASONS

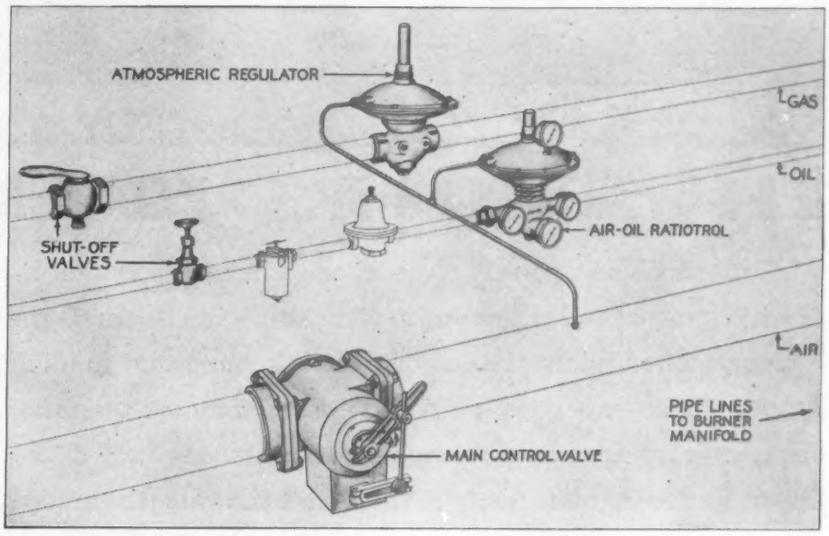
Many Gas Companies furnish gas at an especially attractive rate when used on an off-peak contract. The above system fills the requirements of standby equipment and simplicity of changeover. It is also being used by farsighted plant managers who fear that world conditions may change their fuel position.

SIMILAR FLAME CHARACTERISTICS WITH EITHER FUEL POSSIBLE

By changing the insert of the standard Luminous Flame gas burners, a low pressure air atomizing oil burner can be provided. The same air valve controls the air and gas or oil supplied to the burners.

One Air Valve Controls Fire For Any Number Burners Either Gas or Oil

Fuel-Air Ratio Automatically Controlled By Pressures



In the North American pressure system of proportioning, the oil or gas is directly proportional to the air pressure on the downstream side of the main air control valve. Thus, air or fuel pressure variation, or number of burners in operation have no effect on fuel-air ratio, and thus maximum efficiencies are maintained.

Furthermore, the firing rate or fuel-air ratio of any burner can be changed in respect to the other burners without affecting their fuel-air ratio.

We cordially invite you to write for Engineering Data. The North American Manufacturing Co., 2910 E. 75th St., Cleveland, Ohio.—Adv.

ADVERTISING PAGES REMOVED

The Rangefinder

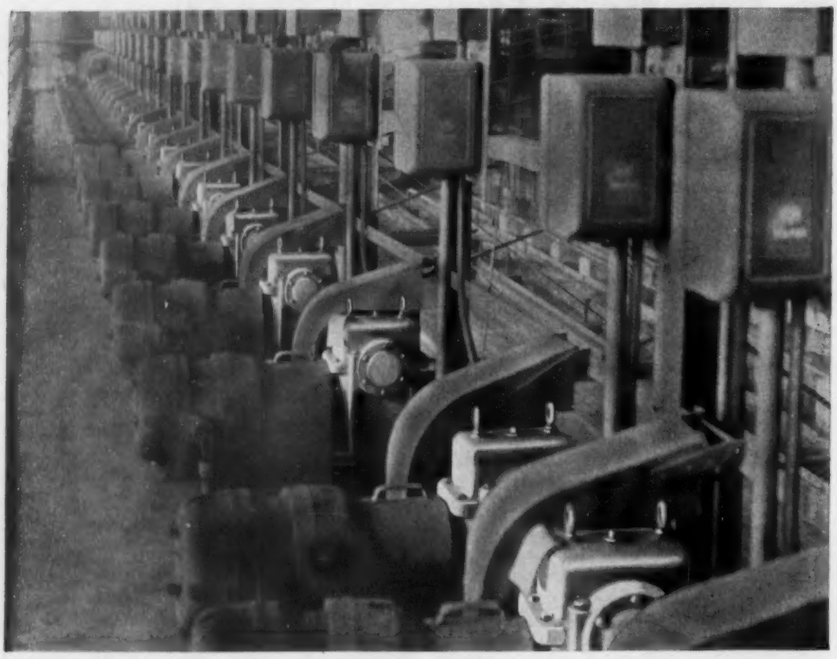
(*Concluded from Page* 70)

section of the two faces of the separating prism. Since this intersection takes place at an oblique angle, it is possible to work the separating prism to a very clear-cut hair-like dividing line between the partial fields.

Another interesting feature is the "halving glass," a piece of plain glass mounted in the line of the beam on one side of the instrument and so aranged that it may be titled. This device enables the operator to corect any "duplication" or "deficiency" of the image (see Fig. 3) from displacement of the optical parts. Tilting the "halving glass" causes one image to move up or down and so correct the error. Equal magnification of both sides of the system, essential to the formation of a complete picture when coincidence is attained, is obtained by means of an "equal magnification" lens which, in effect, modifies the magnification of one side of the system until both are equal.

For observing points of light at night, an astigmatiser is introduced. This consists of two small cylindrical lenses, whose effect is put the object being viewed greatly out of focus vertically and to draw out the image of a small source of light into a narrow vertical streak. It is obvious that great difficulty would be encountered in any endeavor to split the image of such a target and so secure coincidence unless this were done.

Next week, construction details of a modern Barr & Stroud rangefinder will be presented and analyzed.



The Heart of the Mechanism is the

H&S WORM GEAR SPEED REDUCER

☆ Furnace doors open or close at the touch of a button . . . electric power and Horsburgh & Scott Worm Gear Speed Reducers offer many advantages for this important function. Among these are ease of control, simplicity of operation, economy of space and extremely low maintenance. ☆ H. & S. Speed Reducers offer many savings and advantages throughout the range of industry . . . it will pay you to inquire.

Send note on Company Letterhead for Speed Reducer Catalog 39

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Handling Methods

(*Concluded from Page* 90)

line is the path along which a product travels on a pallet on some means of conveyance. As the product moves along, parts are added until the finished product is obtained. The assembly line here, however, consists of two raised tracks grooved to accommodate swivel casters which serve as the means of conveyance along the line.

The casters themselves are standard 4-inch wheels of pressed steel construction. Instead of a pallet, the shipping skid of the unit being built is used.

Convenient holes on each corner of the shipping skid accommodate the 1-inch shank of each caster, making the skid mobile. Thus, this unit rolls along the assembly platform, guided by a single rail made of 1-inch angle iron to hold the unit while assembling and to keep it running straight. Levels and directions are changed several times as the unit is moved through assembly, tests, and final packing assembly of the line.

Casters Drop Out

Still on wheels, the entire unit is moved to the packing area where the shipping crate is assembled and papers and labels attached. Then the fork truck picks up the units, stacking them two or three high, depending on size, and delivering them to the shipping pit. As the truck picks up each unit, the casters drop out and are returned to the head of the assembly line for another cycle and so are used over and over but not wearing the holes into which they are inserted since they are used with a new crate base each time.

This assembly line system has been found extremely flexible. The weights of the units carried range from 250 to 1500 pounds, yet the casters really give very excellent service.

In planning the materials handling system at Bloomfield, we have mechanized wherever possible with the resultant immediate increase in efficiency and economy of handling.

Industry Grapples Distribution Problems

Warehouses put under priority with A-9 preference. Scrap business at standstill. August pig iron output sets all-time record

MARKET IN TABLOID ★

Demand
Few but defense orders being accepted.

Prices
Scrap industry to observe ceiling.

Production
Declined 1 point to 96 per cent.

■ WHILE the priority situation is clearing it is believed at least a fortnight will be required to eliminate rather widespread uncertainties. Lack of full understanding by many consumers in making out prescribed forms is adding to work of steelmakers and retarding booking of new orders.

One effect of information obtained under the priority order is to reduce shipments to consumers with large inventories, some being refused tonnage in September inasmuch as their reports indicate sufficient on hand for the entire month. Strict inventory control is expected to prevent uneven distribution.

Unbalanced deliveries have caused accumulations by Army and Navy, and other consumers, while material was lacking for other defense purposes. At the same time steelmakers claim that most of their customers have only normal supply or less. Some tonnage on mill books represents duplicate buying and wherever this is revealed it will be canceled, thus reducing mill backlogs.

Consumers in many instances are aiding to unscramble the situation by filing PD-73 forms against old orders, instead of taking the full time allowed under M-21 orders, in which the deadline was Oct. 15. Many sellers say a majority, up to 100 per cent in some cases, have responded.

Warehouse priority rating of A-9 has been applied, under a new OPM order, M-21-B, which is expected to relieve the situation considerably and afford opportunity for suppliers to obtain material to rebuild their broken assortments, on a quota basis. This order is expected to expedite filing of forms by consumers, which will afford suppliers information on which to base their orders to mills, indicating uses to which the steel is to be put.

August pig iron production, 4,784,639 net tons, set a new all-time record, exceeding the previous high mark in July by 18,423 tons, a gain of 0.4 per cent. The daily production rate in August was 154,343 tons, an increase of 594 tons over the July rate, setting another record. One additional stack was in production, making the total 213.

Following announcement by Office of Price Administration that ceiling prices on scrap would be enforced strictly, considerable activity resulted in preparing and shipping available scrap from yards, presumably at higher prices. This was followed by almost complete cessation of movement as the industry sought to determine its position. Most dealers and consumers continue to believe higher prices are the only factor which will increase flow of scrap and point to the fact that a larger tonnage appeared when ceiling prices were disregarded in August. The situation is becoming alarming to steelmakers, who approach the winter season with reserves far below normal, supply restricted and consumption at a record rate.

Automotive production last week was 32,940 units, compared with 39,965 the preceding week. In the corresponding period last year production was 39,665 units. This is the first time in a number of weeks that output was below the comparable week last year. Incidence of Labor day probably accounts for the dip.

Due to some Labor day idleness and necessity for repairs steel production last week declined 1 point to 95½ per cent. A higher rate is expected this week. Cleveland increased production 2 points to 95 per cent, Wheeling 1 point to 94 and Cincinnati 1 point to 89. Chicago lost ½-point to 100 per cent; Eastern Pennsylvania ½-point to 95; Buffalo 2½ points to 90½; Detroit 6 points to 86; Pittsburgh 2 points to 98 and Youngstown 2 points to 96. Unchanged were Birmingham at 95, St. Louis 98 and New England 90.

Iron and steel imports in June, 3717 gross tons, were twice the volume of May, but not equal to those of June, 1940. Imports for six months are also below first half last year, 10,708 tons this year, against 38,788 tons a year ago. Scrap imports in June were also above those of May, 6473 tons, compared with 3758 tons, material coming principally from Cuba and Canada.

Under ceiling prices composites are frozen and remain at the level of the past several weeks: Finished steel, $56.60; steel and iron, $38.15; steelmaking scrap, $19.16.

COMPOSITE MARKET AVERAGES

	Sept. 6	Aug. 30	Aug. 23	One Month Ago Aug., 1941	Three Months Ago June, 1941	One Year Ago Sept., 1940	Five Years Ago Sept., 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.15	$37.93	$34.15
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	53.10
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.16	20.05	16.18

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Sept. 6, 1941	Aug. 1941	June 1941	Sept. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Sept. 6, 1941	Aug. 1941	June 1941	Sept. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.15
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	17.75	19.70
Heavy melting steel, Chicago	18.75	18.75	18.75	19.30
Rails for rolling, Chicago	22.25	22.25	22.25	21.35
No. 1 Cast, Chicago	20.00	21.50	21.50	16.85

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$4.75
Connellsville, foundry, ovens	7.25	7.25	7.25	5.75
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, B'ham., base .. 3.05c
Granite City, base..... 3.15c
Detroit, del. 3.15c
Other Mich. pts., del. ... 2.25c
Pacific ports 3.70c

Galvanized Sheets, No. 24

Pittsburgh, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c
Granite City, base..... 3.60c
Pacific ports 4.05c

Corrugated Galv. Sheets

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, 29 gage, per square 3.31c
Granite City 3.38c
Pacific Ports 3.73c

Culvert Sheets

Pittsburgh, Gary, Birmingham, 16-gage, not corrugated, copper steel 3.60c, copper iron 3.90c, pure iron 3.95c.

Pittsburgh, 24-gage, zinc-coated, hot-dipped, heat-treated 4.25c.

Granite City, copper steel 3.70c, copper iron 4.00c, pure iron 4.05c.

Pacific ports, copper steel 4.25c, copper iron 4.55c, pure iron 4.60c.

Enameling Sheets

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c
Granite City, base 2.85c
Pacific ports 3.40c
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c
Granite City, base..... 3.45c
Pacific ports 4.00c

Electrical Sheets, No. 24

	Pittsburgh Base	Pacific Ports	Granite City	Base Deliv. Mahoning Valley Points
Field gr.	3.20c	3.95c	3.30c	3.275c
Armat.	3.55c	4.30c	3.65c	3.625c
Elect.	4.05c	4.80c	4.15c	4.125c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

TYPE	BARS	PLATES	SHEETS	H. R. STRIP	C. R. STRIP
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
304-20% clad	.....	*18.00	19.00	.....	.....
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
316	40.00	44.00	48.00	40.00	48.00
317	50.00	54.00	58.00	50.00	58.00
347	33.00	38.00	45.00	33.00	42.00
403	21.50	24.50	29.50	21.25	27.00
410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
430F	19.50	22.50	29.50	18.75	24.50
431	19.00	22.00	29.00	17.50	22.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

*Includes annealing and pickling.

Motor	4.95c	5.70c	5.05c	5.025c
Dynamo	5.65c	6.40c	5.75c	5.725c
Transformer				
72 ...	6.15c	6.90c	.....	6.225c
65 ...	7.15c	7.90c	.....	7.225c
58 ...	7.65c	8.40c	.....	7.725c
52 ...	8.45c	9.20c	.....	.....

Hot-Rolled Strip

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c
Detroit, del. 2.20c
Other Mich. pts. del. ... 2.25c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less..... 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c
Other Mich. pts. del. ... 2.95c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over..... 2.95c
Worcester, base 3.35c
Detroit, del. 3.05c
Other Mich. pts. del. ... 3.10c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add 20 cents for Worcester.
.26-.50 Carbon 2.80c
.51-.75 Carbon 4.30c
.76-1.00 Carbon 6.15c
Over 1.00 Carbon 8.35c

Tin, Terne Plate

Tin Plate

Pittsburgh, Chicago, Gary, 100-lb. base box..... $5.00
Granite City $5.10

Tin Mill Black Plate

Pittsburgh, Chicago, Gary, base 29 gage and lighter 3.05c
Granite City 3.15c
Pacific ports, boxed..... 4.05c

Long Ternes

Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c
Pacific Ports 4.55c

Spl. Coated Mfg. Ternes

Pittsburgh, Chicago, Gary, 100-base box..... $4.30
Granite City $4.40

Roofing Ternes

Pittsburgh base per package 112 sheets 20 x 28 in., coating I.C.

8-lb....	$12.00	25-lb....	$16.00
15-lb....	14.00	30-lb....	17.25
20-lb....	15.00	40-lb....	19.50

Steel Plate

Pittsburgh, Chicago, Gary, Cleveland, Birmingham,

Youngstown 2.10c
Coatesville, Sparrows Point, Claymont..2.10-2.35c
Gulf ports 2.45c
Pacific Coast ports 2.65c

Steel Floor Plates

Pittsburgh 3.35c
Chicago 3.35c
Gulf ports 3.70c
Pacific Coast ports 4.00c

Structural Shapes

Pittsburgh, Bethlehem, Chicago, Buffalo, Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size..... 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock..... 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000.....	0.35	3100.....	0.70
2100.....	0.75	3200.....	1.35
2300.....	1.70	3300.....	3.80
2500.....	2.55	3400.....	3.20
4100 .15-25 Mo.....			0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni.			1.20
5100 80-1.10 Cr.....			0.45
5100 Spr. flats.....			0.15
6100 Bars			1.20
6100 Spr. flats			0.85
Carb., Van.			0.85
9200 Spr. flats			0.15
9200 Spr. rounds, squares			0.40
T 1300, Mn, mean 1.51-2.00			0.10
Do., carbon under 0.20 max.			0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base..... 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock..... 2.80c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar, .. 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails..... $2.55

(Per Pound)

Polished fence staples.. 2.55c
Annealed fence wire.... 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C.L. column) ... 59
Galv. barbed wire, 80-rod spools, base column .. 70
Twisted barbless wire, column 70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire at Birmingham)

Bright bess., basic wire. 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Rails, Fastenings

(Gross Tons)

Standard rails, mill $40.00
Relay rails, Pittsburgh 20—100 lbs. 32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham. $40.00
Do., rerolling quality.. 39.00

Cents per pound

Angle bars, billet, mills. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
Do., heat treated..... 5.00c
Car axles forged, Pitts., Chicago, Birmingham. 3.15c
Tie plates, base 2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller.....65½ off
Do., ⅜ and ⅝ x 6-in. and shorter.....63½ off
Do., ⅝ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅛-inch and less.	62	64
¼-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	..

Hexagon Cap Screws

Upset 1-in., smaller ....60 off

Square Head Set Screws

Upset, 1-in., smaller ....68 off
Headless, ¼-in., larger ..55 off
No. 10, smaller .....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
½inch and under.....65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. .....$4.00 off

Tool Steels

Pittsburgh, Bethlehem, Syracuse, base, cents per lb.

Carb. Reg. 14.00 Oil-hardening .. 24.00
Carb. Ext. 18.00
Carb. Spec. 22.00 High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
....	4	2	8	54.00
5.50	4	1.50	4	57.50
5.50	4.50	4	4.50	70.00

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13 04	15.03
2¼"O.D.	13	14.54	16.76
2½"O.D.	12	16.01	18.45
2¾"O.D.	12	17.54	20.21
3" O.D.	12	18.59	21.42
3½"O.D.	11	19.50	22.48
4" O.D.	10	24.62	28.37
4½"O.D.	10	30.54	35.20
5" O.D.	9	37.35	43.04
6" O.D.	7	46.87	54.01

Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	51
¼	66½	55
1—3	68½	57½

Iron

⅛	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe, Plain Ends

Steel

1 to 3, butt weld.....	71½
2, lap weld	64
2½ to 3, lap weld.....	67
3½ to 6, lap weld.....	69
7 and 8, lap weld.....	68

Seamless, 3 pts. lower discount.

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm. $45.00-46.00
4-in., Birmingham .. 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in. 52.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs *(Gross Tons)*

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point.. $34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.) $2.00
Do., over ⅝ to ¾-in. incl. 2.15
Worcester, up $0.10 ... ton up $0.25 and Pacific Coast up $0.50 on water shipments.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur... $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered . 12.25
Terre Haute, del. .. 11.75
Milwaukee, ovens.. 12.25
New England, del... 13.75
St. Louis, del. 12.25
Birmingham, ovens.. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol... 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 14.25c
Do. (1000 lbs. or over) 13.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia....$30.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.‡	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00
Do., barge	23.00
No. 2 lump	23.00

Ferroalloy Prices

Ferromanganese, 78-82%,
Carlots, duty paid, sbd. $120.00
Carlots, del. Pitts. 125.33
Carlots, f.o.b. Southern furn. 145.00
For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2¼ per cent carbon 118.00
1¼% carbon 128.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b. Washington, Pa., and Langeloth, Pa., lb. 0.80

Ferrotitanium, 40-45%, lb., con. tl., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, tl., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% tl., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ¼c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, 98-99 per cent, per lb., depending upon quantity $2.50-2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c
88% chrome, cont. tons 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ¼-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00

35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.75	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	7.15	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.65	....	8.75	8.60	9.40
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	6.05	10.60	9.60	9.45	10.10

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 1 to 10 bun. in Los Angeles; 300 and over in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; any quantity in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle, 1 to 99 pounds in Los Angeles; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£	s	d
Merchant bars, 3-inch and over	£66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.79c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8 0(a)
Basic pig iron	24.28	6	0 6(a)
Furnace coke, f.o.t. ovens	7.40	1	16 9
Billets, basic soft, 100-ton lots and over	49.37	12	5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12 0††
Shapes	2.77c	15	8 0††
Ship plates	2.91c	16	3 0††
Boiler plates	3.06c	17	0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15 0
Bands and strips, hot-rolled	3.30c	18	7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton	....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	....
So. African, 48%	70.00-72.00
Brazilian, 46%	69.00-71.00
Chilean, 47%	65.00-70.00
Cuban, 50-51%, duty free	....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced June 18 by Office of Price Administration and Civilian Supply (Gross Tons)

	Pittsburgh, Weirton, Steubenville(a)	Youngstown, Canton, Warren, Sharon	Chicago	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	Ashland, Ky., Cincinnati, Portsmouth, Middletown, O.	Kokomo, Ind.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$18.25
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.75	19.50	19.25	19.50	18.25
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	17.50	16.25
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	14.00	14.75	14.50	14.75	14.25
Machine shop turnings**	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	14.50
Shovel turnings	16.50	16.50	15.25	14.75	15.25	15.25	16.00	15.75	16.00	15.50
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	19.00	17.75
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	13.75
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.50	15.25	15.00	†15.25	14.00
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50
Stove plate	19.00	.....	17.00	18.00	18.50	18.00	18.00	19.00	17.50	16.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.75	23.75	24.50	24.25	23.50	23.75
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Low phos. punch., plate scrap***	[1]23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Machinery cast cupola size††	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Punchings and plate scrap‡‡	[1]22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	20.50	20.75
Punchings and plate scrap§§	[1]21.00	21.00	19.75	19.25	19.75	19.75	20.50	20.25	19.50	19.75
Heavy axle and forge turnings	[1]19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	18.00	18.25
Med. heavy elec. furnace turnings	[1]18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	16.50	16.75

	St. Louis	Toledo, O.	Detroit	Duluth	Birmingham	[2]Alabama City, Ala., Atlanta	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$.....	$17.85	$18.00	$17.00	$17.00	$.....	$.....	$16.50	[4]$14.50
No. 1 hyd. comp. black sheets	17.50	.....	17.85	18.00	17.00	17.00	.....	.....	.....	[4]14.50
No. 2 heavy melting	16.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
Dealer No. 1 bundles	16.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
Dealer No. 2 bundles	15.50	.....	15.85	16.00	15.00	15.00	.....	.....	.....	[4]12.50
Mixed borings and turnings	12.75	13.10	13.10	.....	12.25	12.25	.....	.....	.....	[4]9.75
Machine shop turnings	13.00	13.35	13.35	15.50	15.00	15.00	.....	.....	.....	[4]10.00
Shoveling turnings	14.00	14.35	14.35	16.50	16.00	16.00	.....	.....	.....	[4]11.00
No. 1 busheling	17.00	.....	17.35	17.50	16.50	16.50	.....	.....	.....	[4]14.00
No. 2 busheling	13.00	.....	13.35	13.50	12.50	12.50	.....	.....	.....	[4]10.00
Cast iron borings	13.25	13.60	13.60	13.75	12.75	12.75	.....	.....	.....	[4]10.25
Uncut structurals and plate	18.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
No. 1 cupola	20.00	.....	20.35	[3]19.00	20.00	.....	20.50	21.00	22.00	18.00
Heavy breakable cast	18.50	.....	18.85	[3]17.50	18.50	.....	.....	.....	20.50	17.00
Stove plate	17.00	15.60	14.10	[3]16.00	17.00	.....	17.50	18.00	17.50	14.00
Low phos. billet and bloom crops	22.50	.....	22.85	23.00	22.00	.....	.....	.....	.....	19.50
Low phos. bar crops and smaller	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....	19.50
Low phos. punch. and plate scrap***	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....	17.50
Machinery cast cupola size††	21.00	.....	21.35	[3]20.00	21.00	.....	21.50	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	.....	21.85	[3]20.50	21.50	.....	22.00	22.50	23.50	19.50
Clean auto cast	21.50	.....	21.85	[3]20.50	21.50	.....	22.00	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	.....	19.85	20.00	19.00	.....	.....	.....	.....	16.50
Punchings and plate scrap§§	18.50	.....	18.85	19.00	18.00	.....	.....	.....	.....	15.50
Heavy axle and forge turnings	17.00	.....	17.35	17.50	16.50	.....	.....	.....	.....	14.00
Medium heavy elec. furnace turnings	15.50	.....	15.85	16.00	15.00	.....	.....	.....	.....	12.50

*Claymont, Del., Coatesville, Conshohocken, Phoenixville, Harrisburg, Pa. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Seattle; *** ¾-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ¾-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. **Alloy, W. Va., base $17.60. †Base price at Portsmouth and Ashland; Cincinnati and Middletown 25 cents less. [1]Add $1.75 at Pittsburgh. [2]Atlanta base only on Nos. 1 and 2 H.M. steel, No. 1 comp. sheets and Nos. 1 and 2 dealer bundles. [3]Also base prices at Minneapolis and St. Paul. [4]Add $2 at Minnequa, Colo.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago	Kokomo, Ind.	*East. Pa.	Sparrows Pt.	Cleveland	Ashland, Ky., Portsmouth, Middletown, O.
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$19.25	$19.75	$19.75	$20.50	$20.50
Scrap rails	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.50
Rerolling quality rails (a)	23.50	23.50	22.25	21.75	22.25	22.25	23.00	23.00
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	22.75	22.75	23.50	23.50
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	23.00	23.00	23.75	23.75
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	23.25	23.25	24.00	24.00

	Buffalo	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$20.25	$18.50	$17.00	$18.85	$19.00	$18.00	$15.50
Scrap rails	21.25	19.50	18.00	19.85	20.00	19.00	16.50
Rerolling quality rails (a)	22.75	21.00	19.50	21.35	21.50	20.50	18.00
Scrap rails 3 feet and under	23.25	21.50	20.00	21.85	22.00	21.00	18.50
Scrap rails 2 feet and under	23.50	21.75	20.25	22.10	22.25	21.25	18.75
Scrap rails 18 inches and under	23.75	22.00	20.50	22.35	22.50	21.50	19.00

*Philadelphia, Wilmington, Del.; §Los Angeles, San Francisco, Seattle.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such basing points shall be the maximum price at consumer's plant at any point on the railroad's line. (a) Re-laying quality $5 higher.

Sheets, Strip

Sheet & Strip Prices, Page 108

Scheduling of defense tonnages of sheets and strip has tightened the situation and practically all September production is covered. Schedules for October production are being outlined by many mills. Indications are that within the next 60 days demand for flat-rolled steel will ease somewhat from strictly defense sources, permitting wider distribution. Galvanized sheet output has gained slightly, to about 53 or 54 per cent of capacity.

Wide sheet mills continue to roll considerable tonnage of light plates and an increase is planned as facilities are expanded.

Mills are figuring on 35,000 tons for shell case ends for the army ordnance department. This, with expanding demand for 18-gage sheets for oil drums, features current inquiry. Several inquiries have come out recently for drums for Russia, Great Britain and the United States war and navy departments, all carrying high priority.

Manufacturers of stoves, refrigerators and other household appliances are uncertain as to the extent their production must be curtailed but believe they will be able to obtain steel for partial operation.

Lack of stainless steel and aluminum is causing increased demand for enameled sheets, one new use being roofing material to replace galvanized sheets.

Filing of PD-73 forms against old orders is being done in good volume, although many have to be corrected before being accepted. Lack of clear understanding of proper classification is the principal cause of mistakes in this form. This exists principally in the case of small companies with little defense work.

Buyers of narrow cold strip are not filing form PD-73 as expeditiously as hoped and close to 25 per cent of those already submitted are faulty in detail and are being returned. Confusion has not eased and both production and distribution suffer. Rerollers are scheduling defense tonnage in order of priorities and partially covering regular customers with the remainder of output, which is becoming less. Fabricators in scattered instances have been forced to curtail in some departments due to the lack of certain individual items. Not until next month at least are production departments expected to be in position to classify all defense tonnage and ascertain with any degree of certainty what will remain for civilian needs. By that time additional rulings as to the distribution of the latter by industries are expected. Heavy deliveries against defense orders have also resulted in some accumulation of stock beyond immediate needs as fabricators have not in all instances increased production to absorb all the steel being delivered. Confusion prevails in hot-strip supply and deliveries are less certain

TEAR CORAL ROCK TO PIECES!

These dredge cutter blades, now being rebuilt with P&H Harcote, are delivering three and four times more work hours than formerly on this highly abrasive application in Florida. This is due to the superior hardness and strength of this outstanding electrode. (Full information on request.)

HARCOTE

Its semi-austenitic weld metal has a hardness of approximately 50, Rockwell C, in its as-welded state and builds up great resistance to abrasion under cold working. May be applied to carbon steel, low alloy, and high manganese surfaces.

P&H Harcote is highly recommended for the hard surfacing of many products subject to severe abrasion such as shovel teeth, scraper blades, farm implements, lips and bottoms of shovel buckets, sand and rock handling equipment, etc. An all-position electrode. Ask for simple procedures.

P&H WELDING ELECTRODES

General Offices: 4411 West National Avenue, Milwaukee, Wisconsin

HARNISCHFEGER CORPORATION

WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

on a greater number of finishes and sizes.

Plates

Plate Prices, Page 108

Congestion in plate mills continues, and is more severe than in other major products. Some steelmakers find they can not take on tonnage with priority below A-1-C with any assurance of delivery this year. Shipbuilding and freight car construction are leading contenders for plate tonnage, while miscellaneous industrial demand for defense contracts is heavier and this class work is being booked. Some large tank fabrication has been held up, awaiting plate deliveries. Except for defense practically no new plate tonnage is being accepted and some fabricating shops are pinched for material.

In some cases heavy deliveries of ship plates have resulted in accumulation of tonnage beyond immediate needs and in instances consumption of this material awaits completion of new shipways.

Railroad car builders are obtaining better shipments of plates from Pittsburgh mills, due to increased bessemer output. This has enlarged supply of ¼-inch plates, of bessemer steel, which is fully acceptable to builders. It is claimed bessemer steel always has been as good as open-hearth, change to the latter being brought about by mills.

PLATE CONTRACTS PLACED

575 tons, 12 storage tanks, Shell Oil Co., Wood River, Ill., to Graver Tank & Mfg. Co. Inc., East Chicago, Ind.

250 tons or more, 19 tanks for Portland Gas & Coke Co., Portland, Oreg., to Steel Tank & Pipe Co., Portland.

PLATE CONTRACTS PENDING

200 tons, 400,000-gallon elevated water tank, Advanced Single Engine Flying School, Dothan, Ala.; bids to U. S. engineer, Mobile, Ala., sch. 115.

165 tons, 300,000-gallon elevated water tank, Craig Field, Selma, Ala.; bids to U. S. engineer, Mobile, Ala., sch. 122.

141 tons, low alloy plate steel, Rock Island, Ill., arsenal; bids Sept. 11, cir. 553.

100 tons, estimated, one all-welded steel barge, 130 x 33.5 x 7.5 feet, inv. 838, U. S. Engineer, Pittsburgh; bids Sept. 26.

Unstated, four 15,000-barrel oil tanks for Bethlehem Steel Co., Seattle.

Bars

Bar Prices, Page 109

Bar demand carrying high preference rating is taking so large a part of current output that civilian users have little chance of obtaining much tonnage at present. Application of full priority Sept. 1 is expected to produce marked changes in the industrial situation, particularly for small shops.

Farm implement manufacturers, operating at about 40 per cent above last year, find their B-1 rating of little use. However, for maintenance and repair parts they have an A-10 preference, which gives them some material.

Improvement in the warehouse situation, providing A-9 priority, will be of assistance to smaller users of bars whose tonnages are too small for mills to handle. The warehouse order has now been announced, bearing designation as M-21-B.

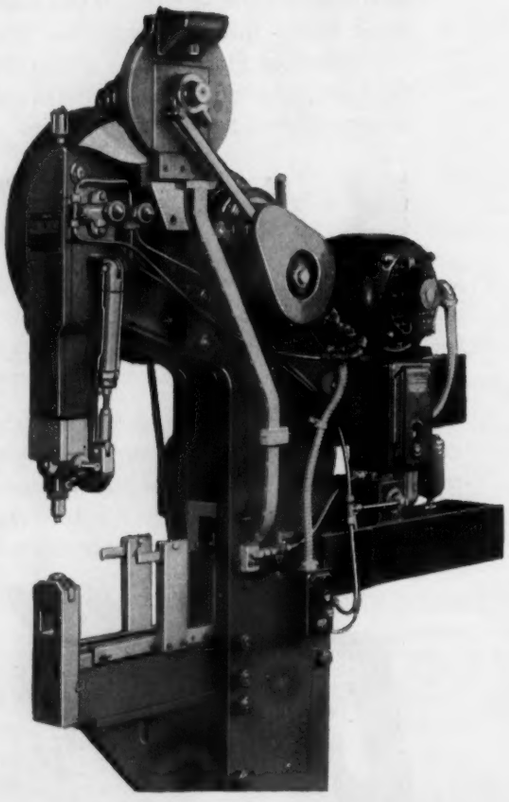
Carbon, cold-drawn and alloy steel bar buying by government arsenal shops continues heavy, deliveries now extending into 1942 on more finishes and taking high priority ratings. Springfield, Mass., armory, now turning out Garrand automatic rifles at the rate of one per minute, is taking monthly shipments of heat-treated chromium-molybdenum stock in larger volume, largely from Republic Steel Corp. Frankford, Pa., arsenal is placing additional volume and at 5.22c, delivered, La Salle Steel Co., Chicago, was low on 1500 tons of cold-drawn bars; Jones & Laughlin Steel Co., Pittsburgh, 700 tons, and Union Drawn Steel division, Republic Steel Corp., Massillon, O., 600 tons. American Steel & Wire Co., New York, took 5,000,000 feet of small diameter bars for Frankford. Picatinny, N. J., arsenal is awarding 1795 tons of cold-drawn steel bars, on which bids closed Sept. 3, and 105 tons of strip steel.

Volume of bars moved by warehouses in New England, usually substantial, is small and direct mill shipments are increasing. Small arms account for much alloy ton-

pierces and rivets

AUTOMATIC FEED "RIVET-PIERCE" RIVITOR

(the new "RK" machine)



The previously unpierced work is driven down over the underfed rivet —punching a slug out of the work. The rivet is then set at the next stroke of the machine.

Handles solid steel rivets (unannealed) of sizes up to .140 dia. x ¼" long. These may be of any flat head type such as "coopers" or "tinners". The size mentioned above can be set in total maximum work thickness of .075.

Write for particulars to

THE TOMKINS-JOHNSON COMPANY

611 North Mechanic St., Jackson, Michigan

this is a **TOMKINS-JOHNSON** *product*

nage in that area and small tools, machinery and ship construction are taking more than usual.

Pipe

Pipe Prices, Page 109

Pipe demand continues good, although there is some slackening in demand for steel pipe and seamless tubing for industrial use in the experience of some makers. A leading producer of merchant pipe, casings and line pipe sold less in August than in July but sales in September have picked up. Some hesitation is noted in pipeline projects from the Southwest to the Atlantic coast.

Pipe needs for shipbuilding continue heavy and most is being moved direct from mills instead of through warehouses. Resellers are able to get black pipe from mills by allocation to meet most pressing needs but as a rule are unable to build up inventory. Current and prospective defense needs are maintained.

Distributors are meeting as much of current demand as possible as users have little stock and press for immediate shipment.

Cast iron pipe production is maintained at the highest rate possible under uncertain supply of pig iron and scrap, a large proportion being for defense needs, though such requirements show signs of being stationary for the present.

CAST PIPE PLACED

150 tons, 8-inch Class 150, for city stock replacements at Seattle, to Hugh G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST PIPE PENDING

180 tons, 6 and 8-inch, District 4, Yakima, Wash.; Hugh G. Purcell, Seattle, low.

STEEL PIPE PENDING

400 tons, 48-inch steel pipe for Philadelphia board of public works; bids Sept. 5.

Wire

Wire Prices, Page 109

As bookings are fairly well divided between defense and civilian needs wiremakers expect some difficulty in obtaining sufficient supply of wire rods to maintain present record production rates. Although forms covering all bookings have not been received, it is certain that considerable tonnage now on books for civilian use will not be covered and eventually will be dropped. One reason for this is that it represents some buying in excess of real needs, orders having been placed for more than actual requirements in order to obtain a pro rata share. This is now forbidden under M-21, forcing cancellation of such orders.

The volume of duplicate buying, known or suspected for some months, is revealed in the classification of undelivered orders by recent priority regulations and such orders are above estimates. Reluctance of some buyers to fill in forms which would bring out this situation is rather widespread; it

Faster CLEANING MEANS *Faster* SHIPMENTS..
..KEEP YOUR CUSTOMERS *Satisfied* WITH
WHEELABRATOR *Speed* CLEANING

CENTRIFUGAL FUSING CO.
Lansing, Michigan
(Using three Wheelabrator Cabinets for Cleaning Brake Drums)
Says: "No other method could give us the production and quality which we must maintain day after day. In 1940 we shipped slightly over five million drums."

WHEN the customer tears his hair and would like to tear yours, too, because castings are not delivered on schedule, where does the trouble lie? More often than not it can be traced to tie-ups in the cleaning room. Just what is the solution to the problem? Certainly it is not to be found in man power. And certainly not by adding more space-taking machines of a type you've already found to be a drag on production. What will help tremendously, however, is to do what hundreds of others have done when faced with the same problem, and that is to install airless WHEELABRATOR speed-cleaning equipment. Read the comments of a few of these users below.

THE PRIZER-PAINTER STOVE WORKS
Reading, Pa.
(Using a No. 3 Wheelabrator Multi-Tablast)
Says: "The volume of production greatly surpasses the former method of sand blasting, which automatically results in a comparatively lower cleaning cost per pound."

HARTFORD ELECTRIC STEEL CORP.
Hartford, Conn.
(Using a 48" x 48" Wheelabrator Tumblast)
Says: "Our actual operating time has been cut to 2½ to 3 hours, with better and more consistent looking castings, and our time of the Sand Blast room has been cut from 24 hours to 8 hours.

BENTON HARBOR MALLEABLE INDUSTRIES
Benton Harbor, Mich.
(Using a 36" x 42" Wheelabrator Tumblast)
Says: "It has reduced cleaning time approximately 50% and we estimate we are saving 300 cu. ft. of air per minute."

ACCURATE STEEL TREATING CO.
Chicago, Illinois
Says: "Formerly we had a man on each shift who handled nothing but shot blasting. Now we do not have a man assigned to this particular work. We find that we can handle it readily enough in the spare time of operators on other work."

NATIONAL SEWING MACHINE CO.
Belvidere, Illinois
Says: "Your machine does a wonderful job of cleaning and does it in an unbelievable short time. We are able to ship to our customers a day earlier on account of the time saved."

TRADE MARK
THE AMERICAN MOLDER
AMERICAN FOUNDRY EQUIPMENT CO.
509 S. BYRKIT ST. MISHAWAKA, IND.

also explains why some fabricators have been able to maintain operations at a high rate.

Meanwhile classification of defense bookings continues with new volume in excess of production in numerous departments, notably spring wire. With thousands of wire products to be classified under mandatory priorities, and these further broken down in sizes and scores of finishes, the wire industry is confronted with a gigantic task and additional rulings will be required to cover numerous individual items.

Inquiry is active in addition to defense business. Warehouse stocks are generally depleted and heavy seasonable demand from agricultural regions is imminent, with small stocks to be drawn on.

Tin Plate

Tin Plate Prices, Page 108

While the canning season is nearing a close, with a food pack of record breaking proportions, tin plate sellers generally are booked up many weeks ahead with no possibility of the usual seasonal letdown in fourth quarter. Contributing to a maintenance of production over coming weeks will be heavy shipments to British colonies with all the tonnage taking lease-lend priorities. These tonnages will involve not only unfabricated plate but large quantities in the form of cans, containing foodstuffs, such as condensed milk, canned meats and soups, in particular.

Incidentally, the tomato crop along the eastern seaboard is said to be especially large this year.

Rails, Cars

Track Material Prices, Page 109

Domestic freight car buying in August was the lightest this year and brought the total for the first eight months to 103,902, against 29,544 in the corresponding period of last year, 12,456 in the same period in 1939 and 8303 in the first eight months of 1938. Further comparisons follow:

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5,508	1,147	2,259	109
March	8,074	3,104	800	680
April	14,645	2,077	3,095	15
May	18,630	2,010	2,051	6,014
June	32,749	7,475	1,324	1,178
July	6,459	5,846	110	0
Aug.	2,668	7,525	2,814	182
8 mos.	103,902	29,544	12,456	8,303
Sept.	.....	9,735	23,000	1,750
Oct.	.....	12,195	19,634	2,537
Nov.	.....	8,234	2,650	1,232
Dec.	.....	7,181	35	2,581
Total	.....	66,889	57,775	16,303

New domestic buying continues light, although in the export field 1000 box cars for Mexico have been placed with Ralston Steel Car Co., Columbus, O., the steel for these cars taking an A-3 priority, the same as applies on domestic freight cars. Moreover, Russia is inquiring for 300 air dump cars.

Meanwhile, car production is lagging seriously, with monthly production now reliably estimated at around 5000 cars, compared with a capacity of 14,000. However, the Steel Priority division in Washington took steps at the beginning of the month to assure that all steel scheduled for freight car builders for September would be delivered as planned. Regardless of the possible urgency of other requirements this schedule was not to be disturbed.

To date approximately 50,000 freight cars have been built this year. While much depends, of course, on labor and materials supply, some leaders in the car building industry are hopeful at least 70,000 to 75,000 can be completed by the end of 1941.

CAR ORDERS PLACED

Michigan Limestone & Chemical Co., 20 dump cars to Austin Western Machinery Co., Aurora, Ill.

Missouri Pacific, 2850 cars, in addition to 2572 previously ordered; 1500 to American Car & Foundry Co., Madison, Ill.; 50 to Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill.; 500 to Pullman-Standard Car Mfg. Co., Butler, Pa.; 650 to Pressed Steel Car Co., Pittsburgh; 150 to Bethlehem Steel Co., Johnstown, Pa.

Southern, eleven 50-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Reading, 58 cabooses, to own shops.

IN ALL METALS

The selection of the right metal in wire cloth is equally as important as the selection of proper mesh and gauge.

The use of Stainless Steel Wire Cloth in a salt solution can be a costly error. The use of Monel Wire Cloth in solutions of Nitric Acid may be equally as costly.

Phosphor Bronze, Commercial Bronze, Copper, Brass, Everdur, Galvanized Before and After Woven Steel, Plain Steel, Monel and Stainless Steel: each of these metals has its proper use as Wire Cloth. For that use each is carried *in stock* by BUFFALO WIRE.

- **What metal retains its tensile at low temperatures?**
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- **Will heat decrease the life of my screens?**

These are questions which we answer daily and make savings for many "Satisfied" BUFFALO WIRE Customers.

YOU CAN ONLY SAVE BY USING THE RIGHT METAL IN THE RIGHT WAY. THERE IS NO OTHER SAVING

Send for Wire Cloth Manual No. 11-S

BUFFALO WIRE WORKS CO., INC.

(Established 1869 as Scheeler's Sons)

437 TERRACE BUFFALO, N. Y.

CAR ORDERS PENDING

Union Pacific, 100 cabooses; bids asked.

LOCOMOTIVES PLACED

Chicago & Northwestern, one 650-horsepower diesel-electric locomotive, to Whitcomb Locomotive Co., Rochelle, Ill.

War Department, 10 gasoline-mechanical locomotives, five to Davenport Besler Corp., Davenport, Ia., and five to Vulcan Iron Works, Wilkes-Barre, Pa.; in addition to 10 previously noted as going to the Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES PENDING

Navy, one fireless steam locomotive for delivery to Charleston, S. C.; bids opened Sept. 5.

Structural Shapes

Structural Shape Prices, Page 109

Though the general trend of structural steel activity is downward because of difficulty of getting plain material and because most defense plant construction has already been erected, Labor Day was apparently the signal for some quickening in inquiries and awards. A constantly larger proportion of awards is for defense, with more and more non-defense projects being abandoned.

New York reports that the next major phase of the defense program will be construction of warehouses for storage of explosives and kindred materials. Also production plants are frequently being enlarged beyond original estimates and extension of power requirements will call for more transmission towers. The trend towards lighter construction places the fabricating industry at about 75 per cent of capacity as to tons, but actual shop and erecting activity is several points higher.

SHAPE CONTRACTS PLACED

4900 tons, foundry, Rouge plant, for Ford Motor Co., Dearborn, Mich., to American Bridge Co., Pittsburgh.

1000 tons, 500 steel towers for 270-mile Coulee-Midway-North Bonneville-Vancouver, three 230 kva transmission lines for Bonneville project, to American Bridge Co., Pittsburgh, low at $1,400,373.

800 tons, building, American Steel Foundries Co., Alliance, O., to American Bridge Co., Pittsburgh.

740 tons, furnace steel, tin smelting plant, Texas City, Texas, to Ingalls Iron Works, through Ford, Bacon & Davis, New York, engineers.

650 tons, engine test and repair building, army depot, Rome, N. Y., to Harris Structural Steel Co., New York, through Turner Construction Co., New York.

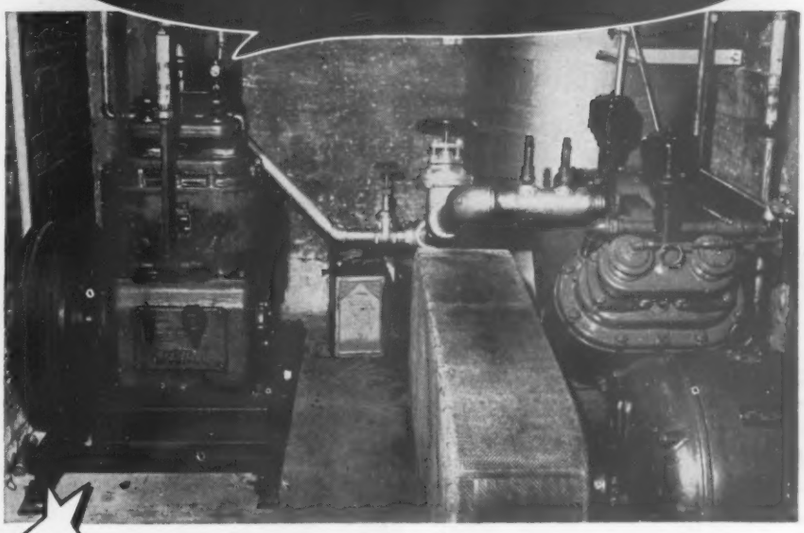
550 tons, building addition, Vanadium Corp., Niagara Falls, N. Y., to the

SHAPE AWARDS COMPARED

	Tons
Week ended Sept. 6	12,046
Week ended Aug. 30	5,761
Week ended Aug. 23	25,160
This week, 1940	49,247
Weekly average, 1941	28,240
Weekly average, 1940	21,326
Weekly average, Aug., 1941	15,793
Total to date, 1940	804,237
Total to date, 1941	1,044,895

Includes awards of 100 tons or more.

Manufacturer Buys 4th CURTIS AIR COMPRESSOR



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As a result, this company has since purchased three additional Curtis compressors—the selection being based upon the unusually efficient performance record of previous Curtis equipment.

This is another example of the dependable, trouble-free performance of Curtis Air Compressors, proven by the operating records of thousands of installations throughout the country.

With Curtis Compressors you can benefit in two ways — by replacing your present overloaded, outworn equipment and by extending the use of air power in your plant. Curtis Compressors are available in capacities up to 360 cfm.

Curtis efficiency and record of minimum maintenance expense is the result of such design features as Timken Roller Bearings, Carbon-free Disc Valves, Centro-Ring Oiling, Automatic Pressure Unloader, and precision workmanship throughout.

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Bethlehem Steel Co., Buffalo.

500 tons, roof framing, Parker dam power house, spec. 1540-D, Earp, Calif., for Bureau of Reclamation, to American Bridge Co., Pittsburgh.

400 tons, building, General Drop Forging Co., Buffalo, to R. S. McMannus Steel Construction Co., Buffalo.

380 tons, Biscayne causeway bascule span, Miami, Fla., for Dade county, Florida, to American Bridge Co., Pittsburgh.

355 tons, state highway bridge, Chenango county, New York, to American Bridge Co., Pittsburgh, through Lane Construction Corp., Meriden, Conn.

325 tons, three small buildings, munitions depot, Kendaia, N. Y. to the Seneca Engineering Corporation, Montrose Falls, N. Y.

310 tons, addition, building 33, General Electric Co., Pittsfield, Mass., to Lehigh Structural Steel Co., Allentown, Pa.

255 tons, crane runway addition, Delco Appliances division, General Motors Corp., Rochester, N. Y., to American Bridge Co., Pittsburgh.

170 tons, storage plant, tin smelting plant, Texas City, Texas, to Mosher Steel Co., Houston, Texas, through Ford, Bacon & Davis, New York, engineers.

165 tons, building, Seneca Ordnance depot, Kendaia, N. Y., to R. S. McMannus Steel Construction Co., Buffalo.

125 tons, building, American Brass Co., Buffalo, N. Y., to R. S. McMannus Steel Construction Co., Buffalo.

111 tons, state highway bridge, Chicasaw county, Iowa, to Clinton Bridge Works, Clinton, Iowa.

110 tons, laboratory building, Electro Metallurgical Corp., Niagara Falls, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, gas generating plant, Connecticut Light & Power Co., Waterbury, Conn., to Berlin Construction Co., Berlin, Conn.

100 tons, addition, Storms Drop Forging Co., Springfield, Mass., to Haarmann Steel Co., Holyoke, Mass.; Adams & Ruxton Construction Co., Springfield, contractor.

Unstated, locomotive cranes for Puget Sound Navy Yard, to Orton Crane & Shovel Co., low at $58,735.

SHAPE CONTRACTS PENDING

40,000 tons, cast iron lining, Battery-Brooklyn tunnel, New York; bids postponed to Sept. 16; alternates on 25,000 tons rolled steel plate liners; also 300 tons structural steel.

12,000 tons, midwest air depot, Marion, Okla., war department.

7500 tons, steel sheet piling, inv. 22, U. S. engineer, Nashville, Tenn.; bids Sept. 11.

2500 tons, heavy materials storehouse, naval magazine, Bellevue, D. C., Bureau of Yards and Docks.

2190 tons, connections between State and Dearborn street subways and Chicago Rapid Transit lines, for City of Chicago; American Bridge Co., Pittsburgh, low; bids Aug. 28.

1800 tons, state highway bridge, route 2, section 39-RF, Rock river, Grand Detour, Ill.

1800 tons, luffing cranes, navy, for export from New York, Philadelphia and Baltimore.

1650 tons, new optical shop buildings, 108 and 109, Philadelphia, for army.

1500 tons, addition, Frankford arsenal, Philadelphia; bids last week.

1400 tons, aviation engine plant, Chevrolet Motors division, General Motors Corp., Tonawanda, N. Y.

1400 tons, Rock river bridge, Grand Detour, Ill., for state; Bethlehem Steel Co., Bethlehem, Pa., low; bids Aug. 29.

1240 tons, state bridge, route S-49, section 5, Wildwood, N. J.

1200 tons, two army hangars in Alaska; bids opened by U. S. engineer, Seattle, Aug. 30.

1200 tons, bridge requirements, various locations, Chicago, Rock Island & Pacific railroad; bids deferred from Sept. 1 to Sept. 8.

1000 tons, lift bridge, Bureau of Yards and Docks, Philadelphia navy yard; bids Sept. 10.

810 tons, manufacturing building, American Bosch Co., Springfield, Mass.

805 tons, emergency plant facilities, Bridgeport Brass Co., Bridgeport, Conn.

480 tons, three bridges, Hamilton county, Ohio.

380 tons, theater and store, Bala-Cynwyd, near Philadelphia.

370 tons, state bridges LR-212, section 12, TR-6, Bradford county, Pennsylvania.

350 tons, state highway bridge, Chenango county, New York, Lane Construction Company, Schenectady, N. Y., contractor.

340 tons, building, Doughnut Corp. of America, Ellicott City, Md.

340 tons, technical service building, airport, Cleveland; bids Sept. 5 also soon pending two other buildings, including heating plant.

320 tons, steam generating plant, Solvay Process Co., Solvay, N. Y.

320 tons, structural steel sections, U. S. engineer, New York; bids Sept. 2, Sch. 44.

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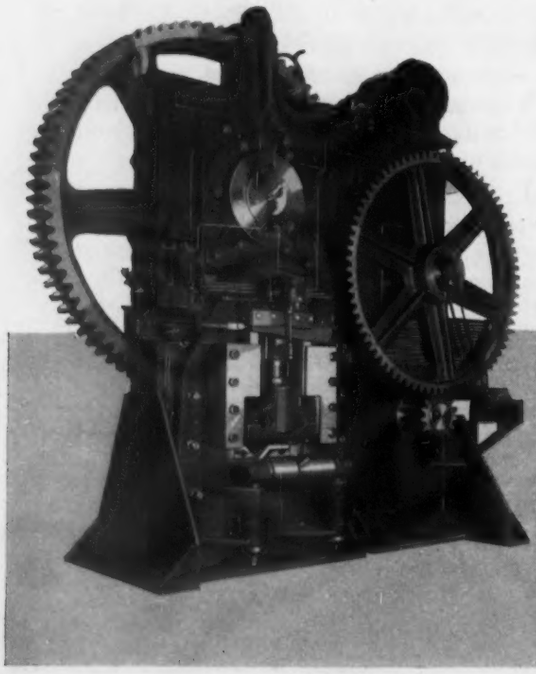
FOR RAPID CUTTING OF ROUNDS • SQUARES • FLATS

"Buffalo" Billet Shears slice through the toughest steel—ready instantly for more. With frames of "Armor Plate" steel, electrically welded for maximum rigidity, these shears have a construction that provides great strength with relatively light weight. Easy to control, economical to operate, "Buffalo" Billet Shears are designed for heavy-duty, 24-hour-a-day production . . . Eleven standard sizes, for cutting rounds up to 10" and squares up to 9". Bulletin 3295 on request.



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BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd. Kitchener, Ont.

"Buffalo"

BILLET SHEARS

310 tons, beams and trusses, Ft. Hancock, Sandy Hook, N. J., army engineers.

280 tons, state highway bridge PSC-6622, Rockland county, New York.

257 tons, crane runways and building addition, John Wood Mfg. Co. Inc., Chicago; bids Aug. 7; project abandoned.

230 tons, foundry building, Bausch & Lomb Co., Rochester, N. Y.

220 tons, distributing station, General Baking Co., Richmond, Va.

200 tons, state highway bridge, Steuben county, New York, no bids, will be rebid.

190 tons, two state highway bridges, Pierre, S. Dak.; bids Aug. 26; Bonesteel & Hyde, Watertown, S. Dak., low on general contract.

170 tons, factory addition, Easy Washing Machine Co., Syracuse, N. Y.

130 tons, bridges Z-496 and LO, Sabula, Iowa and LaCrosse, Wis., for Chicago, Milwaukee, St. Paul & Pacific railroad.

125 tons, building, Twin Coach Co., Kent, O., through H. K. Ferguson Co., Cleveland.

100 tons, state highway bridge, Jefferson County, New York, Bero Engineering & Construction Company, Buffalo, contractor.

100 tons, also 22 tons reinforcing bars, two-span I-beam bridge, route 108, Stowe, Vt.; T. J. Harvey & Son, Adams, Mass., low $32,629, bids Aug. 28, Montpelier.

Unstated, Hillsdale electric substation, Tacoma; bids Sept. 3.

Unstated, pier and warehouse, army supply base, Seattle; bids to constructing quartermaster, Seattle, Sept. 5.

Unstated, radio shelters, portable steel magazines and shop addition, Fort Lewis, Wash.; Sam Bergesen, Tacoma, contractor.

Unstated, machine shop, foundry and other structures, Keyport navy torpedo station, Washington state; bids to Puget Sound navy yard Sept. 2.

Reinforcing Bars

Reinforcing Bar Prices, Page 109

Since concrete bar deliveries are as far extended as for structural steel there is no longer any object in turning to the former for a substitute construction material. Virtually the only bookings are for defense. Should proposal materialize to build merchant ships of concrete, as during the world war, another outlet for an already scarce product, concrete bars, would develop. A number of new defense plants in the Midwest are nearing the planning stage.

REINFORCING STEEL AWARDS

6000 tons, army base initial requirements, Puerto Rico, to Bethlehem Steel Co., Bethlehem, Pa.; Arundel-Consolidated Engineering Co., contractor.

4000 tons, shell loading plant, Parsons, Kans., to Sheffield Steel Corp., Kansas City, Mo.; Kiewit, Paschen & Condon, contractors.

3000 tons, navy yard storehouse, Norfolk, Va., to Bethlehem Steel Co., Bethlehem, Pa.; Rust Engineering Co., contractor.

2500 tons, war department warehouse, Lacarne, O., to Pollak Steel Co., Cincinnati; Skilken Bros., contractors.

1900 tons, Panama Canal schedule 5344, to Republic Steel Corp., Cleveland.

1250 tons, army base, Antiqua, B. W. I., to Jones & Laughlin Steel Corp., Pittsburgh; S. J. Groves & Co., contractors.

800 tons, Glen Hazel Heights defense housing, Pittsburgh, to Dambach Inc.; Starrett Co., contractor.

800 tons, test boring engineering reproduction plant, Washington, D. C., to Bethlehem Steel Co., Bethlehem, Pa.; C. H. Tompkins Co., contractor.

530 tons, plant, Frigidaire division, General Motors Co., Moraine City, O., to Pollak Steel Co., Cincinnati.

500 tons, naval ammunition depot extension, Hingham, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; T. Stuart & Sons, contractors.

500 tons, Avon Signal Corps depot facilities, Fayette county, Kentucky, to Truscon Steel Co., Youngstown, O.; F. Messer & Sons, contractors.

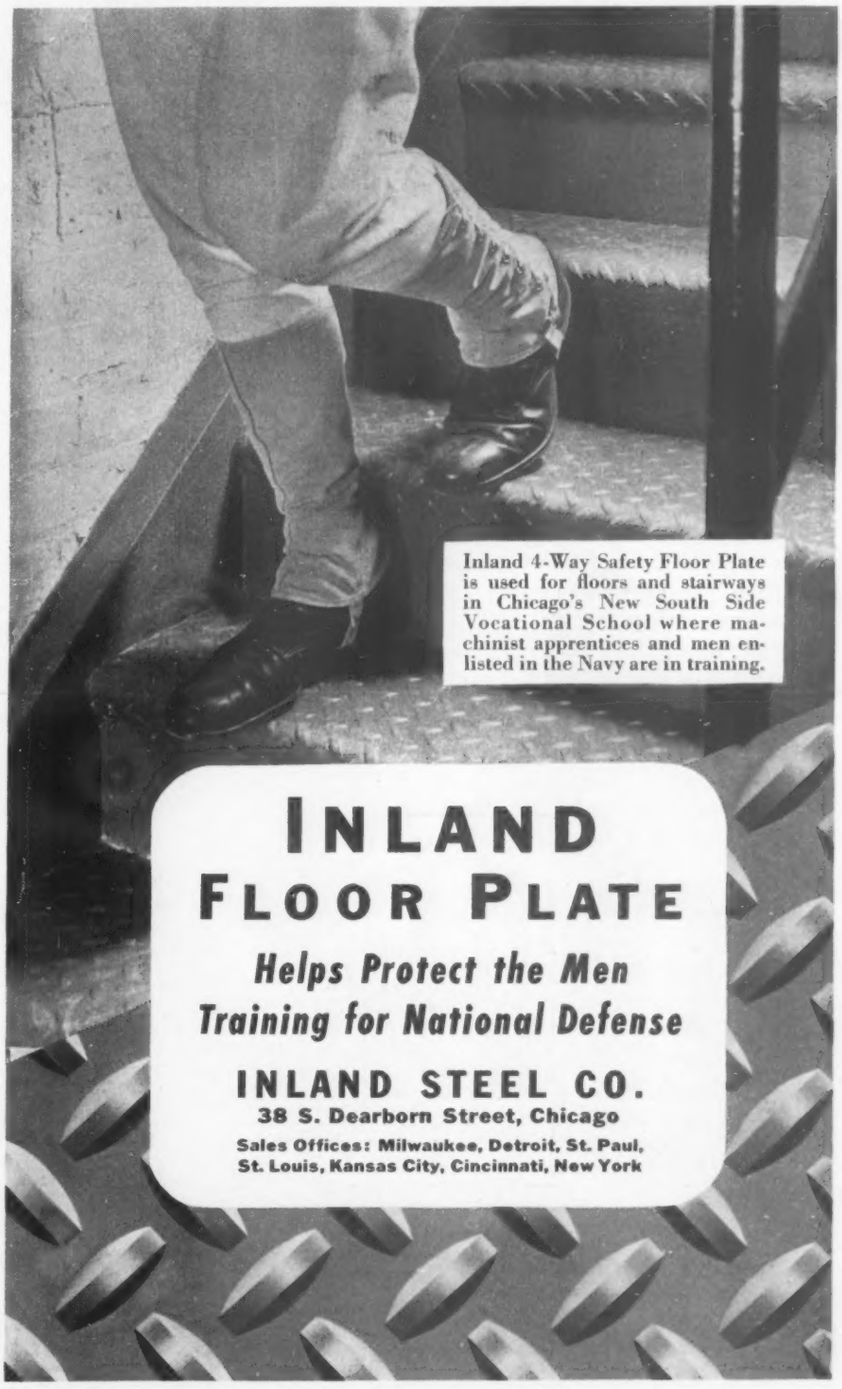
480 tons, bridge, Davison avenue, Detroit, to Great Lakes Steel Corp., Detroit.

415 tons, flood wall, U. S. engineer, Lawrenceburg, Ind., to Laclede Steel Co., St. Louis; Engstrom & Wynn, con-

CONCRETE BARS COMPARED

	Tons
Week ended Sept. 6	25,085
Week ended Aug. 30	7,912
Week ended Aug. 23	21,523
This week, 1940	3,910
Weekly average, 1941	12,719
Weekly average, 1940	8,814
Weekly average, Aug., 1941	14,732
Total to date, 1940	327,408
Total to date, 1941	470,605

Includes awards of 100 tons or more.


Inland 4-Way Safety Floor Plate is used for floors and stairways in Chicago's New South Side Vocational School where machinist apprentices and men enlisted in the Navy are in training.
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FLOOR PLATE
Helps Protect the Men
Training for National Defense
INLAND STEEL CO.
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tractors.

350 tons, building, Mercy hospital, Portland, Me., to Bancroft & Martin Rolling Mills Co., Portland, Me.; W. J. Lynch, contractor.

300 tons, naval research laboratory extension, Bellevue, D. C., to Pollak Steel Co., Cincinnati.

300 tons, addition, Burroughs Adding Machine Co., Plymouth, Mich., to Truscon Steel Co., Youngstown, O.; Esslinger-Misch Co., contractor.

220 tons, Hawkins Village housing, Rankin, Pa., to Jones & Laughlin Steel Co.; Henry Busse, contractor.

200 tons, Edwin C. Shelton apartments, Washington, D. C., to Hudson Supply & Equipment Co.; L. E. Breuniger, contractor.

189 tons, state highway bridge, Hartford, Conn., to Truscon Steel Co., Youngstown, O., Mariani Construction Co., contractor.

180 tons, addition, Cincinnati Milling Machine Co., Cincinnati, to Pollak Steel Co., that city; Austin Co., contractor.

160 tons, silos, Annville, Pa., to Bethlehem Steel Co., Bethlehem, Pa.; E. C. Machin Co., contractor.

110 tons, municipal courthouse, Brookline, Mass., to Republic Fireproofing Co., New York; A. Piotti Co., Boston, contractor.

101 tons, Hoosier Ordnance plant, Watson, Ind., for government, to Ceco Steel Products Corp., Chicago.

100 tons, carburetor test laboratory, Wright Aeronautical Corp., Lockland, O., to Pollak Steel Co., Cincinnati.

100 tons, runways, Wright field, Dayton, O., to West Virginia Rail Co.; Hinton & Smalley, contractors.

100 tons, laboratory, Massachusetts Institute of Technology, Cambridge, Mass., to Concrete Steel Co., Boston; Sawyer Construction Co., Boston, contractor.

REINFORCING STEEL PENDING

3800 tons, superstructure, warehouse, Philadelphia navy yard; postponed to Sept. 9.

3500 tons, Missouri ordnance depot, Louisiana, Mo.; Bechtel, McCone & Parsons, contractors.

3500 tons, shell loading plant, Carbondale, Ill., Sherwin Williams Co.; Boyle & Healy Co., contractor.

2300 tons, additional, drydock, navy yard, Portsmouth, N. H.; also 3700 tons, steel bearing piles and 750 tons, steel sheet piling, Aberthaw Construction Co., Boston, contractor.

1500 tons, Remington small arms plant, Remaco, Colo.; Broderick & Gordon, contractors.

1200 tons, U. S. army supply depot, Marietta, Pa.; Braun & Stuart, contractors.

1000 tons, 1000-ft. pier, army base, Seattle; bids to Capt. H. L. Marion, constructing quartermaster, Seattle, Sept. 5.

900 tons, general depot, warehouse No. 13, Columbus, O.

800 tons, Frigidaire parts assembly plant, Moraine City, O.

650 tons, addition, Edw. Katzinger Co., Chicago; bids Sept. 3.

650 tons, power station addition, Duquesne Light Co., Wireton, Pa.

600 tons, plant, Phelps Dodge Corp., Long Island City, N. Y.; Brown & Matthews, contractors.

530 tons, buildings, Robins Drydock & Repair Co., Brooklyn, N. Y.; C. J. Moore, contractor.

500 tons, Francis Cabrini housing, Chicago; bids Sept. 9.

500 tons, addition, naval Torpedo station, Alexandria, Va.; George Hyman, contractor.

500 tons, Gilpin Court housing, Richmond, Va.; Laburnum Construction Co., contractor.

480 tons, Davidson avenue viaduct, Detroit.

340 tons, building, Columbia Chemical Co., Barberton, O.

300 tons, U. S. engineer's Depot, S. Boston, Mass.; bids Aug. 30.

300 tons, naval research laboratory extension, Washington; Chas. H. Tompkins, contractor.

287 tons, bridge over Grassy Sound, Wildwood, N. J.; bids Sept. 5.

260 tons, naval base recreation building, Norfolk, Va.; Doyle & Russell, contractors.

250 tons, highway proj. 196, Cincinnati; Sept. 9.

250 tons, girls' dormitory, Scott's hotel, Washington, D. C.

250 tons, bridge over Potomac river, Sandy Hook, Md.

250 tons, armament laboratory building, Wright field, Dayton, O.; F. Messer & Sons, contractors.

223 tons, expanded steel mesh, U. S. engineer, New York; bids Sept. 3, sch. 47.

200 tons, also 80 tons steel piling, Peavy Falls dam, Sagola, Mich.; C. R. Meyer & Sons, Oshkosh, Wis., contractor.

190 tons, exchange building, Illinois Bell Telephone Co., Rockford, Ill.

170 tons, RCA research laboratory, Princeton, N. J.; H. K. Ferguson Co., contractor.

MORE BATCHES—CHEAPER

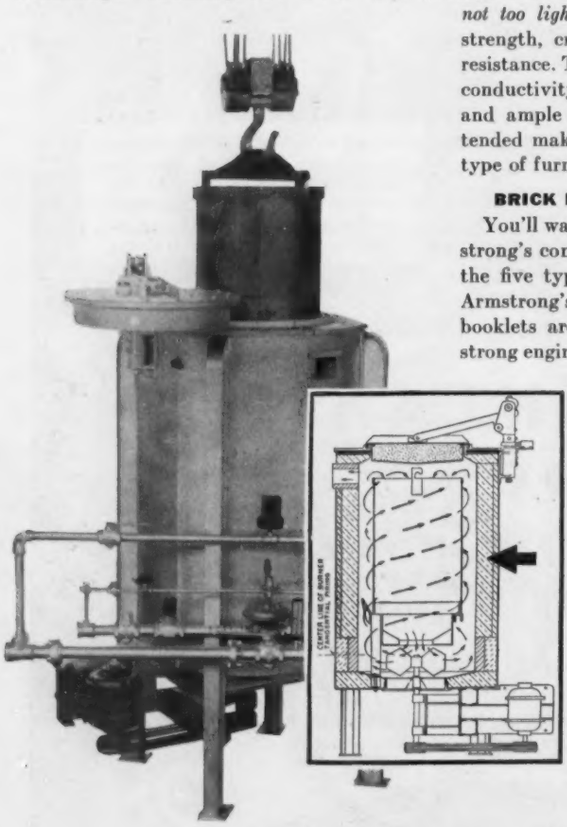
. . . . . when efficient ARMSTRONG'S INSULATING FIRE BRICK are on the job!

THE new Surface Combustion Gas-fired Batch Type Convection Furnaces are recommended for all heat treating operations of both ferrous and nonferrous metals and alloys up to 1200° F. Dependable Armstrong's Insulating Fire Brick help them to do these operations efficiently . . . they heat up quicker, use less fuel, and hold temperatures within closer ranges.

Armstrong's Brick are available in five types—each adapted to a specific service. All these brick are light in weight, *but not too light* to have adequate breaking strength, crushing strength, and spalling resistance. Their low coefficients of thermal conductivity, low heat storage, uniformity, and ample refractoriness for the use intended make them ideal for almost every type of furnace design.

BRICK FACTS FOR YOU . . . FREE!

You'll want full information about Armstrong's complete high temperature line—the five types of Armstrong's Brick and Armstrong's Cements. Two illustrated booklets are newly available. Also, Armstrong engineers are available to help solve any insulation problems you may have. For your free booklets and facts about this service, write now to Armstrong Cork Co., Building Materials Division, 985 Concord Street, Lancaster, Pa.



NEW S. C. BATCH TYPE CONVECTION FURNACE *for tempering or drawing small ferrous parts. Also used for annealing and ageing of nonferrous metals and alloys. Drawing shows circulation of hot gases. 4½" thick Armstrong's Insulating Fire Brick contribute to furnace efficiency.*

Armstrong's

HIGH TEMPERATURE INSULATION

150 tons, Kurth Malting Co., Milwaukee.

150 tons, addition, aircraft assembly plant, Ft. Crook, Nebr.

150 tons, additional runways, Westover field, Chicopee Falls, Mass.

140 tons, factory, American Bosch Corp., Springfield, Mass.

140 tons, two test houses, Pratt & Whitney Aircraft Co., East Hartford, Conn.

125 tons, municipal terminal market, Brooklyn, N. Y.

120 tons, Raccoon Creek reservoir, Centralia, Ill.

120 tons, Thilmany Pulp & Paper Co., Kaukauna, Wis.

115 tons, Chevrolet division, General Motors Corp., Bay City, Mich.

105 tons, fire station and garage, navy yard, South Boston, Mass.

100 tons, Delco Remy gear plant, Muncie, Ind.

100 tons, pumping station, East Hartford, Conn.; Frank T. Westcott Co., North Attleboro, Mass., contractor.

100 tons, 3-span, continuous reinforced Bureau of Roads, bridge, Curry county, Oregon; Tom Lillebo, Reedsport, low. $33,116.

100 tons, theatre, Bremerton, Wash.; Henrik Valle Construction Co., Seattle, low; McClelland & Jones, Seattle, architects.

Unstated, foundry, shops, utilities, etc., Keyport torpedo station, Washington state; bids to Capt. R. E. Thomas, Public Works officer, Bremerton, Wash. soon; plans ready Sept. 2.

Pig Iron

Pig Iron Prices, Page 110

Pig iron producers are receiving shipping instructions from Washington and an eastern supplier finds he will be able to meet all priority requirements of his customers down to and including A-9 in September. Some cases have occurred where Washington has turned down tonnage requests of defense consumers because they had enough iron in stock to last through the month, even though approval would not have meant increase in their inventory 30 days later. This indicates they will not be allowed to maintain their present stocks. This is in line with the effort to carry out the filing schedules originally proposed in the pig iron order.

Merchant furnaces continue to allot tonnage in strict conformity with priority permits where allocation has not been made by Washington. Few consuming plants have been forced to close down for lack of iron though many are operating on the edge, with little iron on yards.

Lighting of the Holt, Ala., blast furnace by Tennessee Coal, Iron & Railroad Co., provides an additional source of iron in the South, most of its product being destined to manufacture of cast iron pipe. All stacks in the Birmingham district are in blast, pig iron output being the largest on record.

Shipments have been held up in many instances until government instructions have been received, producers preferring to conform strictly to regulations rather than proceed without full authority. In some cases shipments have been delayed on even highest priorities.

American Rolling Mill Co., Middletown, O., has received word from Washington recommending that both Hamilton furnaces be kept on basic iron, although it had been thought one might be put on foundry iron to relieve shortage in the Cincinnati district.

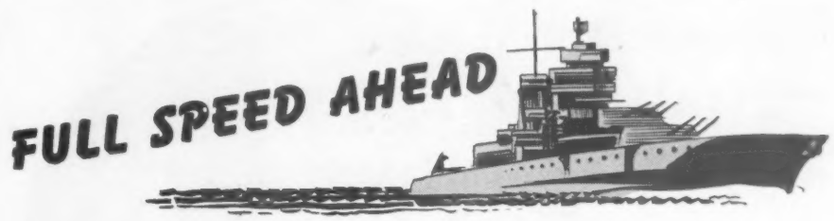
Scrap

Scrap Prices, Page 112

First effect of announcement by Office of Price Administration that ceiling prices on scrap would be enforced Sept. 2 was a sharp acceleration of shipments, all material that could be prepared being started from yards to melters. Presumably this had been sold at prices above ceiling.

After this brief flurry the market was at a standstill in most centers. Brokers ceased buying from collectors and consumers were unable to place orders. Some consumers canceled all orders as soon as the ceiling announcement was made, as a gesture of compliance.

Efforts to place orders for scrap seem unavailing as dealers are unable to find tonnage and steelmakers are taking practically all their requirements from reserve stocks, which are much below what is regarded as the safety point. In general, brokers and consumers evince a desire to abide by the government edict but most are in doubt as to



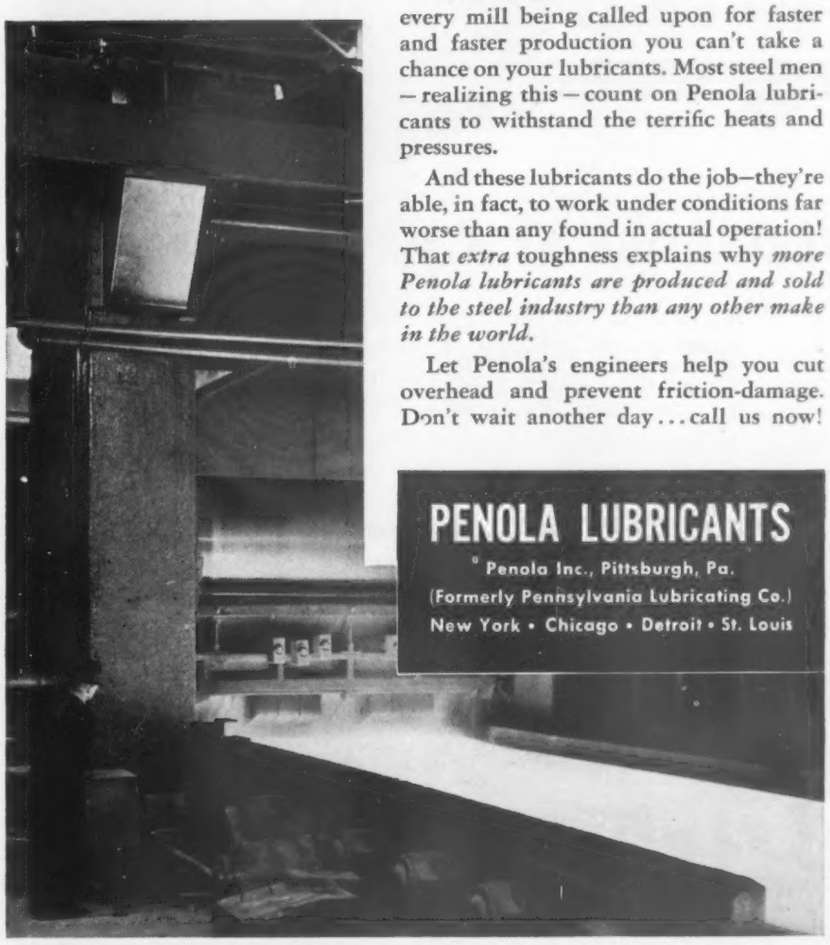
WITH PENOLA!

THERE MUST be no delay in the Nation's gigantic ship-building program. Tanks, and guns, too—these need steel and they need it *fast!*

It's no time to flirt with friction. With every mill being called upon for faster and faster production you can't take a chance on your lubricants. Most steel men — realizing this — count on Penola lubricants to withstand the terrific heats and pressures.

And these lubricants do the job—they're able, in fact, to work under conditions far worse than any found in actual operation! That *extra* toughness explains why *more Penola lubricants are produced and sold to the steel industry than any other make in the world.*

Let Penola's engineers help you cut overhead and prevent friction-damage. Don't wait another day... call us now!



PENOLA LUBRICANTS

Penola Inc., Pittsburgh, Pa.

(Formerly Pennsylvania Lubricating Co.)

New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1865

the outcome. They feel prices are too low to encourage collections and move scrap from sources to dealers' yards.

The situation parallels that of a few months ago, before the ceiling regulation was evaded and higher prices paid. The effect of this was to increase movement. The industry believes higher prices constitute the only answer to the present impasse.

Recent addition of Cincinnati as a basing point on scrap is being studied and first appearances are that melters in that district will be benefited, scrap being attracted there at the expense of nearby consuming points. It is claimed, however, that prices limit the field from which scrap can be obtained in competition with other areas.

Warehouse

Warehouse Prices, Page 111

Priority of A-9 has been granted steel warehouses under OPM order M-21-B, issued last week. All distributors must file with the priorities division before Sept. 15 a report on form PD-83-A showing deliveries during first qparter and from these reports will be determined what percentage of first quarter sales should be set as a quota for delivery to warehouses during fourth quarter. Notification of quota will be given each warehouse by Oct. 5. Fourth quarter quotas will apply to succeeding quarters until a change is made.

Until Oct. 5 deliveries may be made to warehouses to the extent of one-third of first quarter purchases. Deliveries from warehouse are limited by the order, except for small sales as specified. Alloy steel may be delivered only for defense purposes. Orders for carbon steel may be filled for nondefense purposes after defense orders are completed.

Exemptions from these requirements permit monthly deliveries of alloy steel on small nondefense orders up to 10 per cent of the average monthly deliveries of such material during the first quarter of 1941. Small orders as defined in the order are in the following amounts: Alloy tool steel, 50 pounds per item; stainless steel, 50 pounls per item; other alloy steel, 300 pounds per order.

Pacific Coast

Seattle—Steel for defense projects is the dominant note of the market, plant facilities employed almost exclusively in fabricating materials for army, navy and other public units. It was reported this week that public agencies had been unable to place 2000 tons of reinforcing bars. Award is immediately pending of 11,000 tons of shapes and 1000 tons of reinforcing for the new Boeing aircraft plant.

Large awards featured the week. Webster-Brinklev Co., Seattle, received a $2,250,000 contract for 252 steam steering engines for freighters under construction for Great Britain, 60 units being placed with Sumner Iron Works, Everett, Wash. Webster-Brinkley plans a continuous production line, one engine a day being scheduled.

Iron Ore

Iron Ore Prices, Page 111

Shipments of Lake Superior iron ore in August broke all records at 11,496,303 tons, according to the Lake Superior Iron Ore Association. The previous record had been made in July at 11,390,488 tons. Likewise the movement for the season to date is a new record at 51,712,722 tons, against 38,236,609 tons

PERFECTION AS A MATTER OF COURSE

■ The steel ball bearing is a theory put into practice. Based on the principle of *rolling contact*, it represents one of the greatest steps ever taken in the matter of overcoming friction. While STROM BALLS possess all the qualities required in first class ball bearings, the makers stress the unequalled surface smoothness and sphericity of STROM BALLS. By virtue of a unique lapping operation extreme precision is obtained—and this is done as a matter of course at the Strom Plant. Every STROM BALL is unconditionally guaranteed for physical soundness, correct hardness, size accuracy and sphericity. Also available in all standard sizes are other types of balls: STAINLESS STEEL, MONEL, BRASS and BRONZE. Catalog and prices sent on request.

Strom STEEL BALL CO.

1850 SOUTH 54TH AVENUE • CICERO • ILLINOIS

The largest independent and exclusive Metal Ball Manufacturer

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten types

For each 1% tungsten contained	
Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 0.50 vanadium	13.50
Turnings, millings, same basis	11.50

for the like period of 1940. At the end of the first ten days of August it looked like 11,800,000 tons for the month. However, thick weather, less activity by Canadian boats, congestion of boats at ore docks and heavy coal movements caused some falling off in activity later in the month.

Shipments in gross tons for August were:

	August 1941	August 1940
Escanaba	566,513	480,724
Marquette	753,158	820,269
Ashland	884,317	945,931
Superior	4,161,658	3,848,461
Duluth	2,906,075	2,838,059
Two Harbors	2,157,848	1,546,534
U. S. ports	11,429,569	10,479,978
Michipicoten	66,734	54,453
Grand total	11,496,303	10,534,431
Increase over year ago	961,872	

Cumulative shipments for the season to Sept. 1 were:

	To Sept. 1, 1941	To Sept. 1, 1940
Escanaba	3,006,566	1,950,700
Marquette	3,714,385	3,341,991
Ashland	4,463,064	3,540,976
Superior	18,181,001	13,579,618
Duluth	12,857,212	9,075,120
Two Harbors	9,195,839	6,571,042
U. S. ports	51,418,067	38,059,447
Michipicoten	294,644	177,162
Grand total	51,712,711	38,236,609
Increase from year ago	13,476,102	

Canada

Toronto, Ont.—To increase supply of steel and facilitate deliveries to vital war industries, further stiffening of mandatory control and priorities are to be introduced immediately by the government, through the steel controller. Under the new ruling it is stated that practically all orders for steel will have to go through the office of the steel controller for approval, and that steel will be handled along similar lines to pig iron. Already such materials as plates, sheets, bars and similar materials have been affected, with the result that primary producers now accept only orders approved by the controller. The new regulation practically shuts out supply of steel to civilian industry, and further curtailment is under consideration.

Canadian mills are not accepting orders for sheets. While mills are fully contracted on current sheet production, it is expected some additional output may be forthcoming in last quarter.

Structural steel lettings in connection with government war projects are gaining rapidly, with awards for the week totaling about 12,000 tons. Industrial plant construction also is calling heavily on structural steel fabricators and big orders are pending from this source. Private construction, however, is slowing down, due to difficulty in obtaining steel.

While no action has been taken towards bringing iron and steel scrap under government control, other than price regulation, it is expected some action may be taken soon. The steel controller has modified the original ruling of July 9, and is permitting dealers with contracts on hand previous to that date to deliver outside the province in which the material was ordered, at the old contract price to and including Sept. 30.

Steel in Europe

Foreign Steel Prices, Page 111

London—(*By Cable*)—Practically all steel output in Great Britain now is concentrated on war production. The supply position is good and delivery periods have been shortened for some lines. Structural steel demand is quiet except for shipbuilding sections. Tin plate is quiet, with the outlook uncertain.

Nonferrous Metals

New York—Demand for metals continues to exceed supply while the percentage of supplies going into defense continues to climb.

Copper—OPM estimates total demand in September at 140,000 tons while supply is estimated at 131,000 tons.

Lead—Total stocks are now less than 95,000 tons, a new low for

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BIGGEST "HIT"
When The Pressure's On!

MACWHYTE
Atlas
SLINGS

made from LEFT-&-RIGHT LAY Endless Wire Ropes to S-P-E-E-D Your Loads SAFELY!

Because they're made of braided construction (patented), Macwhyte Atlas Slings are . . .

Absolutely NON-SPINNING:

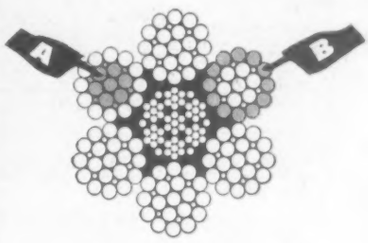
Extremely flexible, kink-resistant, light-weight, easy to handle, SAFE:

Extra long lasting, because the left-lay AND right-lay wire ropes work together — a balanced construction with each part carrying its share of the load.

Send for Sling Catalog S-6 on Company letterhead stating title.

Patented, braided body made from left-&-right lay endless wire ropes

MACWHYTE
PREformed
CRANE ROPES



made with 2 kinds of wire for EXTRA staying power.

A. Extra Flexible Inner Wires in every Monarch Whyte Strand PREformed rope are improved plow steel . . . specially designed with extra flexibility for service inside the strands.

B. Extra Tough Outer Wires in Monarch PREformed are also improved plow steel. They are made with a tough wear-resisting "skin" specially for service on outside strands.

PLUS INTERNAL LUBRICATION . . . which protects unseen, inside wires which are the reserve strength of your rope upon which safety depends.

Use the CORRECT rope for your equipment
MACWHYTE PREformed CRANE ROPE

MACWHYTE COMPANY, *2912 Fourteenth Avenue, Kenosha, Wisconsin.* Manufacturers of wire rope to meet every need — left-&-right lay braided slings — Stainless Steel Wire Rope — Aircraft cable, Aircraft tie rods, and "Safe-Lock" Swaged Terminals. NO. 570

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Nonferrous Metal Prices

Aug.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
30	12.00	12.00	11.75	52.00	52.00	5.85	5.70	7.25	17.00	14.00	35.00
Sept.											
2	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	7.25	17.00	14.00	35.00
3	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	7.25	17.00	14.00	35.00
4	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	7.25	17.00	14.00	35.00
5	12.00	12.12½	11.75	52.00	52.00	5.85	5.70	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	10.00-10.25
Cleveland	10.00-10.25
Chicago	9.25-9.50
St. Louis	9.50

Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

Composition Brass Turnings

New York	9.25

Light Copper

New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

Light Brass

Cleveland	5.50-5.75
Chicago	5.75-6.00
St. Louis	5.75-6.00

Lead

New York	5.00-5.25
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50-4.75

Old Zinc

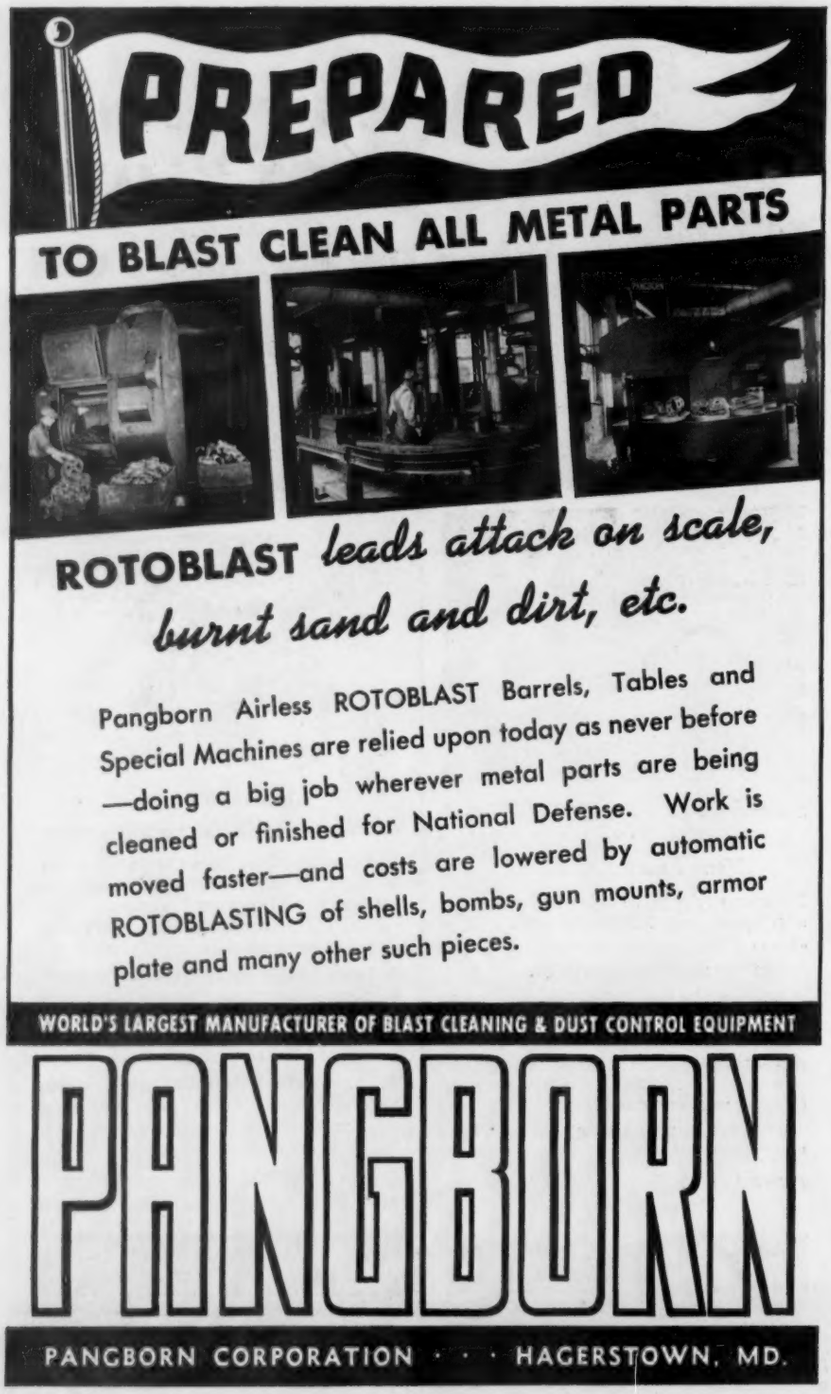
New York	4.50
Cleveland	4.00-4.12½
St. Louis	4.50-5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00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ROTOBLAST leads attack on scale, burnt sand and dirt, etc.
Pangborn Airless ROTOBLAST Barrels, Tables and Special Machines are relied upon today as never before —doing a big job wherever metal parts are being cleaned or finished for National Defense. Work is moved faster—and costs are lowered by automatic ROTOBLASTING of shells, bombs, gun mounts, armor plate and many other such pieces.
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PANGBORN CORPORATION · · · HAGERSTOWN, MD.

many years. Domestic consumers are taking more than 80,000 tons of refined metal per month but MRC is releasing part of its reserves.

Zinc—Although demand for defense work continues to increase, nearly 50 per cent of available supplies are available for civilian use.

Tin—Far Eastern tin prices continue at such a high level domestic importers are still offering only moderate tonnages at the 52-cent level. MRC is releasing a small amount to meet emergency spot needs.

Ferroalloys

Ferroalloy Prices, Page 110

Ferroalloy prices for fourth quarter will undoubtedly be named this week. Some trade leaders believe there will be no change, but until action is taken there can be no definite assurance.

Meanwhile, pressure continues heavy for chrome, manganese, silicon, tungsten and vanadium alloys in particular, with probably little improvement in the movement this month, however, because power is still being restricted by dry weather in the South.

Ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports, and 19 to 21 per cent spiegeleisen at $36, Palmerton, Pa.

Warehouse Priority Order

(*Concluded from Page* 39)

terms of this Order should be addressed to:

Mr. A. D. Whiteside
Chief, Iron and Steel Branch
Office of Production Management
Social Security Building
Washington, D. C.

Very truly yours,
Donald M. Nelson
Director of Priorities

Official Order

TITLE 32 — NATIONAL DEFENSE CHAPTER IX—OFFICE OF PRODUCTION MANAGEMENT Subchapter B—PRIORITIES DIVISION—Part 962—STEEL SUPPLEMENTARY ORDER M-21-b RELATING TO STEEL WAREHOUSES.

962.3 SUPPLEMENTARY ORDER. (a) Definition. For the purpose of this Supplementary Order, "Warehouse" means any person who receives physical delivery of steel from a producer for sale or resale in the form received.

(b) Limitation of Deliveries to Warehouses.

(i) After Oct. 5, 1941, no Warehouse shall accept from a producer any delivery of steel on consignment or otherwise until a quota has been established for such Warehouse, pursuant to paragraph (c), and no such delivery shall be made or accepted except within the limits of such quota.

(ii) For the period between the effective date of this Supplementary Order and Oct. 5, 1941, no Warehouse shall accept from a producer and no producer shall make to a warehosue any delivery of any type of steel product in excess of one-third of the deliveries of such type of product by such producer to such Warehouse during the first quarter of 1941.

(c) Quota. On or before Sept. 15, 1941, each Warehouse desiring to obtain a quota shall file in quadruplicate with the Director of Priorities a report in form prescribed by the Director. After such filing, the Director shall establish a quota for such Warehouse and shall notify such Warehouse as to the amount of such quota. The Director may from time to time establish a quota for any type of steel product and may vary the amount of any quota established for any product or group of products.

(d) Assignment of Preference Rating to Deliveries to Warehouse. The Director of Priorities will issue to each Warehouse for which a quota is established pursuant to paragraph (c) a certificate assigning a preference rating of A-9 to deliveries of steel to such Warehouse, within the limits of such quota. Such preference rating may be changed from time to time by the Director of Priorities.

(e) Limitation of Deliveries by Warehouse. Except as permitted by paragraph (f), no Warehouse shall make deliveries of alloy steel from its stock except on defense orders. After making provision for present and anticipated defense orders, and subject to the terms of General Preference Order M-21, a Warehouse may make deliveries of carbon steel from its stock to nondefense customers.

(f) Exception of Small Sales by Warehouses. A warehouse may, during any calendar month, make deliveries of the materials in the quantities specified below, on any rated or unrated order, provided that the total amount of each such material delivered to all customers in this manner during any calendar month shall not exceed ten per cent (10%) of the average monthly deliveries of each such material by the Warehouse to all customers during the first calendar quarter of 1941, and further provided that nothing contained in this paragraph shall be construed to excuse any person from complying with the applicable provisions of General Preference Order M-14, to conserve

MAXIMUM CAPACITY RADIAL AND THRUST TYPE BEARING

CJB AHLBERG

AHLBERG PILLOW BLOCKS

Serve under severe conditions

THE COMBINATION of qualities found in this ball and socket, self-aligning pillow block distinguish it from ordinary designs. They make it preferable for jobs where performance and dependability are paramount.

Ball and socket design — easier to install — easier to align. Maximum ball type double row bearing. Great radial capacity — extra thrust capacity — smooth running at high speeds.

Patented adapter type shaft lock — assures full contact on shaft — positive lock — centers shaft — eliminates vibration — assures full capacity of bearing.

Floating type Labyrinth Seals are most efficient — keep out dirt and retain lubricant. Write for complete Bearing Catalog.

AHLBERG BEARING COMPANY
Manufacturers of CJB Master Ball Bearings
3015 West 47th Street - - - Chicago, Ill.

the supply and direct the distribution and use of tungsten in high speed steel.

Material	Deliveries not to exceed
(1) Alloy Tool Steel	50 lbs. per item
(2) Stainless Steel	50 lbs. per item
(3) Other Alloy Steel	300 lbs. per order

(g) Special Instructions. The Director of Priorities may from time to time issue specific directions to Warehouses requiring them to earmark stocks or to make deliveries during specified periods in fulfillment of contracts, commitments, or purchase orders for particular purposes or to particular persons. Such directions will be made primarily to insure satisfaction of all defense requirements of the United States, both direct and indirect, and they may be made, in the discretion of the Director of Priorities, without regard to any preference ratings assigned to particular contracts, commitments or purchase orders.

(h) Effective Dates. This Supplementary Order shall take effect on the 2nd day of September, 1941, and, unless sooner terminated by direction of the Director of Priorities, shall expire on the 30th day of November, 1941, (O.P.M. Reg. 3, Mar. 7, 1941, 6 F.R. 1596; E. O. 8629, Jan. 7, 1941, 6 F.R. 191; sec. 2(a), Public No. 671, 76th Congress as amended; sec. 9, Public 783, 76th Congress.)

Issued this 2nd day of September, 1941.

Donald M. Nelson
Director of Priorities

Iron, Steel Imports 3717 Gross Tons in June

■ Iron and steel imports, excluding scrap, in June totaled 3717 gross tons, valued at $374,166, according to the Department of Commerce. Although this was twice as much as imported in May, 1875 tons, valued at $264,591, it was well below June imports in 1940, which totaled 5504 tons, valued at $530,343.

Cumulative imports for six months were 10,708 tons, valued at $1,748,076, compared with 38,788

U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

	1941		1940	
	Exports	Imports	Exports	Imports
Jan.	698,853	423	583,521	8,274
Feb.	600,240	796	671,301	6,740
Mar.	567,227	6,273	663,980	5,096
April	635,809	4,286	612,906	6,674
May	472,734	5,633	783,964	7,759
June	457,685	10,190	936,047	5,505
July	.....	.....	1,034,938	3,542
Aug.	.....	.....	1,402,075	2,105
Sept.	.....	.....	1,221,052	2,598
Oct.	.....	.....	1,105,510	3,966
Nov.	.....	.....	788,176	980
Dec.	.....	.....	805,158	4,064
Tot.	.....	.....	10,608,628	57,303

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Off your train, through a covered passage—and you're in Hotel Cleveland.

Gay dance bands in two colorful restaurants.

A maitre d' who is a past master at assuring the success of convention banquets . . . sales dinners . . . private parties.

For your convenience a miniature city of shops, in the Hotel.

Rooms from $3

HOTEL CLEVELAND Cleveland

tons, valued at $4,499,577, in the corresponding period in 1940.

Canada was the chief supplier in June, 1348 tons of rails and track material, 1245 tons of spiegeleisen and 622 tons of ferrosilicon. Sweden furnished 274 tons and the United Kingdom 103 tons.

Scrap imports totaled 6473 tons

ORIGIN OF JUNE IMPORTS

Gross Tons

	Iron ore	Manganese ore
United Kingdom	23	.....
Canada	34,611	.....
Mexico	954	61
Cuba	11,400	13,951
Chile	164,400	1,470
Brazil	10,900	3,847
Newfoundland	2,640	....
Bolivia	.....	35
Phillipine Is.	.....	978
British India	.....	9,210
Soviet Russia	.....	2,828
South Africa	.....	4,134
Gold Coast	.....	10,890
Morocco	.....	14
Total	224,928	47,418

	Sheets, skelp and sawplate	Structural steel	Steel bars
Canada	26	9	17
Switzerland	.....	.....	1
United Kingdom	.....	.....	9
Kwantung	.....	.....	1
Sweden	.....	.....	14
Total	26	9	42

in June, compared with 3758 tons in May. Cuba was chief supplier, with 4621 tons, the remainder coming from Canada, 1187 tons, Bermuda, 657 tons and U.S.S.R., 8 tons.

UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

(Gross Tons)

ARTICLES	June 1941	June 1940	Jan. thru June 1941
Pig iron	.....	643	.....
Sponge iron	.....	.....	23
Ferromanganese (1)	.....	1,346	11
Spiegeleisen	1,245	2,260	2,926
Ferrochrome (2)	2	.....	69
Ferrosilicon (3)	622	126	1,836
Other ferroalloys (4)	.....	.....	.....
Steel ingots, blooms, etc.	1	...	1
Billets, solid or hollow	1	31	56
Concrete reinforc. bars	.....	1	2
Hollow bar, drill steel	.....	32	153
Bars, solid or hollow	42	80	162
Iron slabs	.....	.....	...
Iron bars	.....	.....	15
Wire rods	14	78	105
Boiler and other plate (including skelp)	1	1	8
Sheets, skelp, saw plate	26	9	44
Die blocks or blanks, etc.	5	.....	6
Tin plate, taggers' tin and terneplate	15	6	60
Structural shapes	9	.....	49
Sashes and frames	63	16	150
Sheet piling	.....	.....	.....
Rails and track material	1,348	531	2,623
Cast-iron pipe, fittings	.....	.....	.....
Malleable iron pipe fittings	.....	.....	.....
Welded pipe	.....	.....	.....
Other pipe	28	135	572
Cotton ties	.....	.....	.....
Other hoops and bands	.....	.....	.....
Barbed wire	.....	.....	.....
Round iron, steel wire	1	18	28
Teleg., telephone wire	.....	.....	.....
Flat wire, steel strips	246	101	1,516
Wire rope and strand	10	56	88
Other wire	.....	.....	1
Nails, tacks, staples	9	8	21
Bolts, nuts, and rivets	6	3	22
Horse and mule shoes	.....	.....	.....
Castings and forgings	23	23	161
Total	3,717	5,504	10,708
Iron and steel scrap	6,473	1	16,893
GRAND TOTAL	10,190	5,505	27,601

(1) Manganese content; (2) Chrome content; (3) Silicon content; (4) Alloy content.

Where seconds count—

The smooth-acting positive control of air operated equipment that you get with Hannifin Air Control Valves makes control easier, helps keep up continuous production. These valves have the bronze disc controlling air flow ground and lapped to make a perfect seal with the seat, which is similarly finished. There is no packing, and no leakage or packing maintenance troubles.

Hannifin Air Control Valves are made in 3-way and 4-way types, hand and foot operated, manifold, spring return, heavy duty rotary, electric and special models. Write for Valve Bulletin 34-S.

HANNIFIN MANUFACTURING COMPANY • 621-631 So. Kolmar Ave., Chicago, Ill.

ENGINEERS • DESIGNERS • MANUFACTURERS • DOUBLE-ACTING PNEUMATIC AND HYDRAULIC CYLINDERS, ALL SIZES

HANNIFIN "Packless" AIR CONTROL VALVES

PRODUCTION ECONOMY IN DEFENSE WORK

Less handling, more speed and better welding (down-hand at every point) is accomplished on C-F Positioners. Set-up an assembly just once and top, bottom and sides are positioned by rotating 360° and tilting 135°. Table may also be adjusted to various heights for large work.

THIS IS THE MACHINE

A No. 60—3 ton capacity C-F Positioner with many exclusive features designed for fast maneuvering of welding assemblies with safety and economy.

At top is 155 MM field gun and large illustration shows bottom carriage being welded on C-F Positioner described at right.

Write today for our informative circular WP 20 describing welding economy in production

CULLEN-FRIESTEDT CO.,

1308 S. KILBOURN AVE. CHICAGO, ILLINOIS

Construction and Enterprise

Illinois

CHICAGO—Western Electric Co. will expand its Hawthorne works by about 100,000 square feet by lease of former plant of Indestro Mfg. Co. at Forty-seventh street and St. Louis avenue. Property will be improved and equipment installed.

CHICAGO HEIGHTS, ILL. — Victor Chemical Co., 14 West Jackson boulevard, Chicago, has let contract for a three-story 75 x 110-foot addition to its plant here to J. W. Snyder Co., 307 North Michigan avenue, Chicago, at cost estimated at $75,000.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 118 and Reinforcing Bars Pending on page 120 in this issue.

CHICAGO—American Forge Co., division of American Brake Shoe & Foundry Co., 4544 West Twenty-sixth street, is building an addition 28 x 65 feet, one story, at 2621 South Hoyne avenue.

DOWNERS GROVE, ILL. — Rite-Rite Mfg. Co., 1501 West Polk street, Chicago, has given contract for a one-story 100 x 200-foot plant to Schless Construction Co., 236 North Clark street, Chicago. G. H. Buckley, 644 North Michigan avenue, Chicago, is architect. Cost is estimated at $75,000.

LA GRANGE, ILL.—Electro Motive Corp. has given contract for an addition to its No. 2 plant, including pump plant addition to sewage treatment plant, to Ragnar Benson, 3744 West Rice street, Chicago.

NEWTON, ILL.—City has awarded contract for sewage disposal plant and about 50,200 feet of sewers to L-K Construction Co., Terre Haute, Ind., at $81,214. Thomas J. Hardman, 2100 South Center street, Terre Haute, Ind., is engineer.

NORTHBROOK, ILL.—M. B. Austin Co., 108 South Desplaine street, Chicago, is having plans revised for two-story plant it plans to erect here, at cost of $50,000. M. L. Pereira, 100 West Monroe street, Chicago, is architect.

ROCKFORD, ILL. — W. F. & John Barnes Co., 301 South Water street, will build addition to its shell casting plant at cost of over $150,000. Plant will be operated under agreement with war department. A. L. Jackson Co., 161 East Erie street, Chicago, has the contract.

Connecticut

BRIDGEPORT, CONN. — Automatic Machine Co., 136 East Washington avenue, has let contract for plant additions and alterations to De Fonce Construction Co., 51 Hurd avenue, at about $60,000.

BRIDGEPORT, CONN. — Bullard Co. has let contract for a one-story 60 x 156-foot warehouse on Blackrock road to Turner Construction Co., 420 Lexington avenue, New York, estimated to cost about $75,000. A. D. Crosett, 512 Fifth avenue, New York, is engineer.

BRISTOL, CONN.—New Departure division of General Motors Corp., 269 North Main street, will let contract soon for a one-story 160 x 583-foot factory unit for Plant C, to cost about $500,000. Albert Kahn, 345 New Center building, Detroit, is engineer.

HARTFORD, CONN.—Maxim Silencer Co., 58 Homestead avenue, is taking bids on a one and two-story 100 x 130-foot and one-story 35 x 100-foot addition, to cost about $120,000. Buck & Buck, 650 Main street, are engineers.

HARTFORD, CONN.—Hanson-Whitney Machine Co., 169 Bartholomew avenue, has let a contract for a two-story plant addition to Bartlett & Brainerd Co., 103 Woodbine street, to cost about $75,000. J. T. Henderson, 750 Main street, is engineer.

STAMFORD, CONN.—City is having plans prepared for a sewage disposal plant, incinerator and trunk sewers, to cost about $1,000,000. W. Raisch, 227 Fulton street, New York, is consulting engineer.

New York

BUFFALO—Standard Iron & Metal Co. Inc. has been incorporated with 200 shares by Abraham N. Carrell, Hyman Carrell and Albert A. Goldman, all of Buffalo.

BUFFALO — Niagara Shipbuilding Corp., 36 Washington street, has let contract for a shipbuilding plant to Siegfried Construction Co., 6 North Pearl street, to cost about $400,000.

JAMESTOWN, N. Y.—Rane Tool Co. Inc., 17 Ross street, will build a 55 x 100-foot factory; contract to Warren Construction Co. Inc., 335 Steel street, to cost about $40,000.

MANITOU BEACH, N. Y.—Odenbach Shipbuilding Corp. plans construction of a shipyard to cost about $720,000 for land and buildings and $150,000 for machinery and equipment, for Maritime Commission, to be financed by Defense Plants Corp.

NIAGARA FALLS, N. Y.—Great Lakes Carbon Corp., Pine avenue, has let contract for a 70 x 200-foot plant addition to Laur & Mack Contracting Co., 1400 College avenue, to cost about $50,000.

New Jersey

BENDIX, N. J.—Bendix Aviation Corp., South Bend, Ind., will build a 180 x

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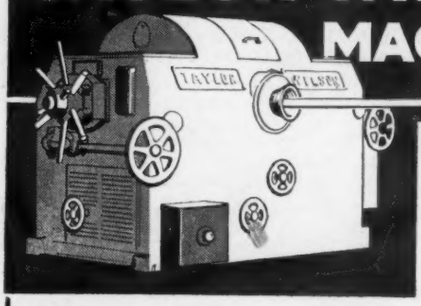

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400-foot magnesium foundry, costing about $500,000; contract to the Austin Co., 19 Rector street, New York. (Noted June 9.)

BRIDGEWATER, N. J.—Singer Sewing Machine Co., Trumbull street, Elizabeth, N. J., has let contract for a one-story 400 x 600-foot manufacturing building to Austin Co., 19 Rector street, New York.

PASSAIC, N. J.—Okonite Co., Canal street, will build a two-story 60 x 140-foot plant addition; contract to F. L. Dillen Construction Co., 75 Church street, Lodi, N. J. Cost estimated at about $70,000.

Ohio

CLEVELAND—Commercial Plating & Welding Co., 1802 East Eighty-seventh street, Martin J. Rosenjack, owner, is being incorporated to provide capital for enlarged production on defense subcontracts.

CLEVELAND—Canfield Oil Co., East Thirty-seventh street, has bought 1½ acres adjacent to plant for expansion and may erect additional storage tanks. M. C. Dippel, 3216 East Fifty-fifth street, is purchasing agent.

ELYRIA, O.—Bendix Westinghouse Automotive Air Brake Co., 901 Cleveland avenue, R. L. Morison, vice president and general manager, is making plans for a further addition covering 25,000 square feet.

ELYRIA, O.—Romec Pump Co., 333 West Bridge street, plans a third addition to increase production of aircraft pumps, located on Abbey road, to cost about $300,000, including equipment. Will cover 18,000 square feet factory space and will be financed by Defense Plant Corp. W. L. Davis is manager.

YOUNGSTOWN, O.—E. E. Emery, 260 West Front street, is building a machine shop at that location.

Pennsylvania

DANVILLE, PA.—Kennedy Van Saun Mfg. & Engineering Co., Danville, will build a 100 x 200-foot manufacturing building; contract to Austin Co., 19 Rector street, New York.

ERIE, PA.—Hammermill Paper Co., A. S. Goodrich, chief engineer, East Lake road, will take bids soon on a one-story 40 x 50-foot boilerhouse extension. O. C. Schoenwork, 3240 North Lake Shore drive, Chicago, is engineer.

ERIE, PA.—American Hollow Boring Co., C. E. Mueller, general manager, has let contract for a one-story 60 x 120-foot warehouse addition to Sessinghaus & Ostergaard Inc., 1115 Peach street. Myers & Johnson, 821 Commerce street, are architects.

ERIE, PA.—Hays Mfg. Co., 801 West Twelfth street, will build a one-story 50 x 200-foot warehouse; contract to Henry Platt Co., 922 Raspberry street. Cost estimated at about $40,000. H. Nelson, Hayes building, is engineer. (Noted Aug. 4).

LOCK HAVEN, PA.—American Aniline Products Inc., Dr. T. James, technical director, will build a boilerhouse and install turbogenerators and other equipment, at cost of about $320,000.

MIDLAND, PA.—Socony-Vacuum Oil Co., 230 Park avenue, New York, plans to build a marine petroleum products terminal here.

Michigan

DETROIT—Burroughs Adding Machine Co., 6071 Second boulevard, will build a one-story manufacturing building; contract to Erslinger-Misch Co., 159 East Columbia street, at estimated cost of $195,000. Albert Kahn Inc., New Center building, is architect.

DETROIT — Builder-Thompson Engineering & Research Corp., 2164 Penobscot building, has been incorporated with $300,000 capital, mechanical engineering and equipment, by John L. Builder, 1109 Iroquois street, Detroit.

JACKSON, MICH.—Anotreat Inc., 300 South East avenue, has been incorporated with $50,000 capital to treat anodic metals and metal products, by Ben T. Kohone, 1100 Jackson City Bank building, Jackson.

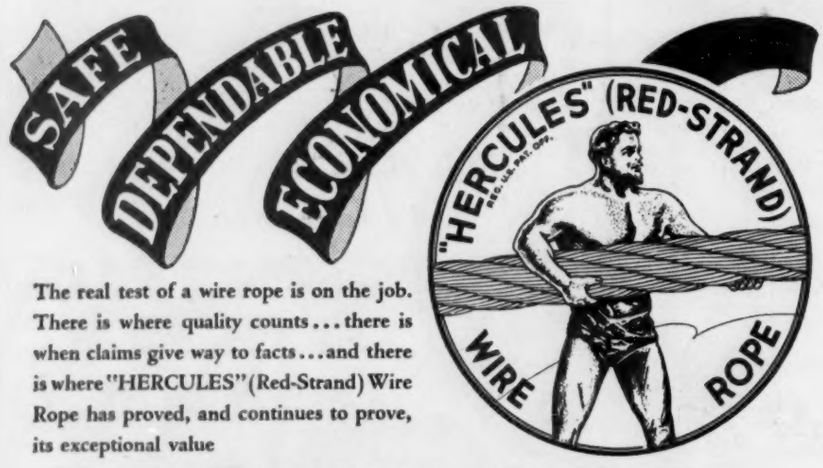
VAN DYKE, MICH.—Quality Engineering Inc., box H, Van Dyke, has been incorporated with 50 shares no par value to deal in metal stampings and wood patterns, by James A. Covert, 7283 Lozier street, Van Dyke, Mich.

Indiana

RICHMOND, IND.—Belden Mfg. Co. will start operations in its new plant about Oct. 15, adding 31,000 square feet to facilities. Product will be solid and stranded bare and tinned wire, largely for defense.

FORT WAYNE, IND.—Zollner Machine Co. will build a plant addition to double production space, to cost $300,000 or more, with equipment.

WHITING, IND.—American Smelting & Refining Co. plans a one-story plant addition on Indianapolis boulevard, to



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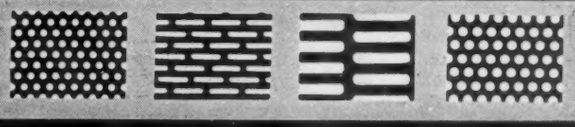

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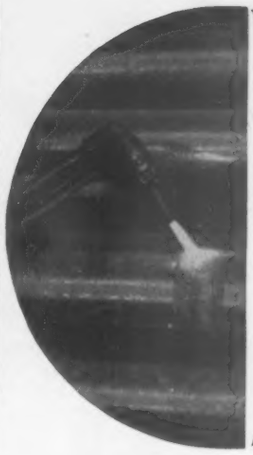

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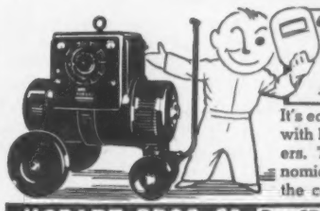

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cost about $100,000.

JEFFERSONVILLE, IND. — Colgate-Palmolive-Peet Co., New York, will build a four-story plant 163 x 403 feet on plans by Albert Kahn Associated Architects & Engineers Inc., Detroit.

Missouri

KANSAS CITY, MO.—Chicago, Rock Island & Pacific railroad is having plans made for a bridge across the Missouri river here. Howard, Needles, Tamen & Bergendorff, Orear-Leslie building, Kansas City, are consulting engineers.

Arkansas

LITTLE ROCK, ARK.—Aluminum Co. of America, Gulf building, Pittsburgh, plans to erect on a site in Arkansas, an aluminum smelter with annual capacity of 100,000,000 pounds, to cost about $11,000,000 and an aluminum production plant with 400,000 pounds capacity, to cost $13,000,000, both to be financed by Defense Plants Corp.

Iowa

ANKENY, IOWA—War department has given contract to Smith, Hinchman & Grylls, architects, 800 Marquette building, Detroit, to prepare plans for the $10,000,000 small arms manufacturing plant to be erected here. Plans for utilities, which will cost about $7,000,000, are being made by H. R. Green Engineering Co., 417 First avenue S.E., Cedar Rapids, Iowa.

CEDAR RAPIDS, IOWA—Iowa Electric Light & Power Co., Security building, has let contract for a boiler unit to Paulsen Construction Co., Cedar Rapids, Iowa, over $50,000.

MUSCATINE, IOWA—First Iowa Hydroelectric Co-operative plans construction of a hydroelectric generating plant to cost about $13,500,000. Hubbard Engineering Co., Chicago, is engineer.

Idaho

BOISE, IDAHO—J. D. Beery Co., Lewiston, Idaho, has been given contract at $94,531 for construction of fireproof engineering laboratory for the University of Idaho.

California

LOS ANGELES—Torms Aircraft Engineering Corp. Inc. has been organized with $100,000 capital by G. G. Baker, Jr., Los Angeles, and associates. Leonard Comegys, 811 West Seventh street, Los Angeles, is representative.

LOS ANGELES—El Capitan Aircraft Corp. has been organized with $500,000 capital by S. S. Santiago, E. D. Malone and E. M. Martin, Los Angeles. A. McDowell, 4624 South Central avenue, Los Angeles, is representative.

LOS ANGELES—Aircraft Heat Treating Co., 6415 McKinley avenue, has been formed by Wade E. Miller and Harold Barr.

LOS ANGELES—Magnesium Products Co., 1127 Santa Fe avenue, is building a plant 52 x 62 feet, costing $6000.

LOS ANGELES—Norris Stamping & Mfg. Co., 5215 South Boyle avenue, is building an addition costing about $6000 to increase production of cartridge cases and other defense products.

LOS ANGELES—Universal Steel Sash Co., 901 East Ninth street, has been purchased by the Vimcar Steel Sash Co.

LOS ANGELES—American Smelting & Refining Co. is building a storage building 36 x 60 feet, to cost about $6000, at 4010 East Twenty-sixth street.

SAN DIEGO, CALIF.—San Diego Light & Power Co. is having plans prepared for an electric generating plant at the foot of Sampson street, 280 x 500 feet, to cost about $400,000.

Oregon

PORTLAND, OREG.—United States engineer has called bids for Sept. 16 for improvements at Boise, Idaho, airport, including warehouse, heating plant, assembly shop, trailer shed, four magazine buildings, six steel igloos, two steel tanks, chain link fence and three 10-kva. transformers.

PORTLAND, OREG.—United States engineer has called bids Sept. 12 for construction of warehouse, hangar alterations and other improvements at Boise, Idaho, air base.

Washington

HOQUIAM, WASH. — Grays Harbor Shipbuilding Co. has begun construction of marine shipbuilding ways. Plans include mill and joiner shop 140 x 250 feet and loft 50 x 250 feet.

SEATTLE—Seattle-Tacoma Shipbuilding Co. has given contract to Isaacson Iron Works for a paint and oil warehouse at its plant, 2400 Eleventh avenue S. W.

SEATTLE—American Brake Shoe & Foundry Co., 4785 First avenue South, has given contract to Atherton Construction Co. for an addition 17 x 99 feet.

SEATTLE—Standard Steel Fabricating Co. & Boiler Works has changed its name to Standard Steel Fabricating Co., increased capital and changed stock from no par to par value.

SEATTLE—Washington Chemical & Salt Co. has been incorporated with $92,500 capital by Herbert R. May, 527 Fourth and Pike building, and associates.

VANCOUVER, WASH.—City will ask bids soon for overhead crane, hoists, gas tanks, pumps and other equipment for municipal shops.

Canada

HAMILTON, ONT.—Wallace Barnes Co. Ltd., 274 Sherman avenue North, will build an addition costing $75,000, with equipment; contract to W. H. Cooper Construction Co. Ltd., Medical Arts building.

KINGSTON, ONT.—Aluminum Co. of Canada Ltd., 1010 St. Catharine street West, Montreal, Que., will build plant addition here, including forge shop, to cost about $750,000, with equipment; contract to Anglin-Norcross Ltd., 892 Sherbrooke street West, Montreal, Que.

TORONTO, ONT.—Canadian Acme Screw & Gear Ltd., Weston road, has bought seven acres adjoining its plant and will build a one-story addition covering 100,000 square feet, for production of shell cores.

TORONTO, ONT.—Addison Industries Ltd., Geary avenue, will enlarge plant at cost of about $50,000, including equipment, for manufacture of electrical equipment for war use.

TORONTO, ONT.—Canadian Aircraft Instruments & Accessories Ltd., associated with Self-Priming Pump & Engineering Co. Ltd., Slough, England, and Korect Depth Gauge Co., Croydon, England will build an addition to increase production 50 per cent to cost about $100,000 with equipment.

SAULT STE. MARIE, ONT.—Chromium Mining & Smelting Co. Ltd., Huron and Queen streets, has given contract to Belmont Construction Co. for plant addition to cost about $150,000, with equipment, including crusher, cranes, etc.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., 2790 Sandwich street, has given contract to Dinsmore-McIntyre Ltd. for erection of foundry addition 225 x 280 feet, to cost about $130,000.

WINDSOR, ONT.—Chrysler Corp. of Canada Ltd., 300 Tecumseh road, J. D. Mansfield, manager, is having plans prepared for an addition 200 x 209 feet, to cost about $250,000, with equipment.

ST. LAURENT, QUE.—Department of munitions and supply, Ottawa, Ont., has given contract to Cook & Leitch, 1440 St. Catharine street, West, Montreal, Que., for aircraft assembly and repair depot here, to cost about $250,000, with equipment.

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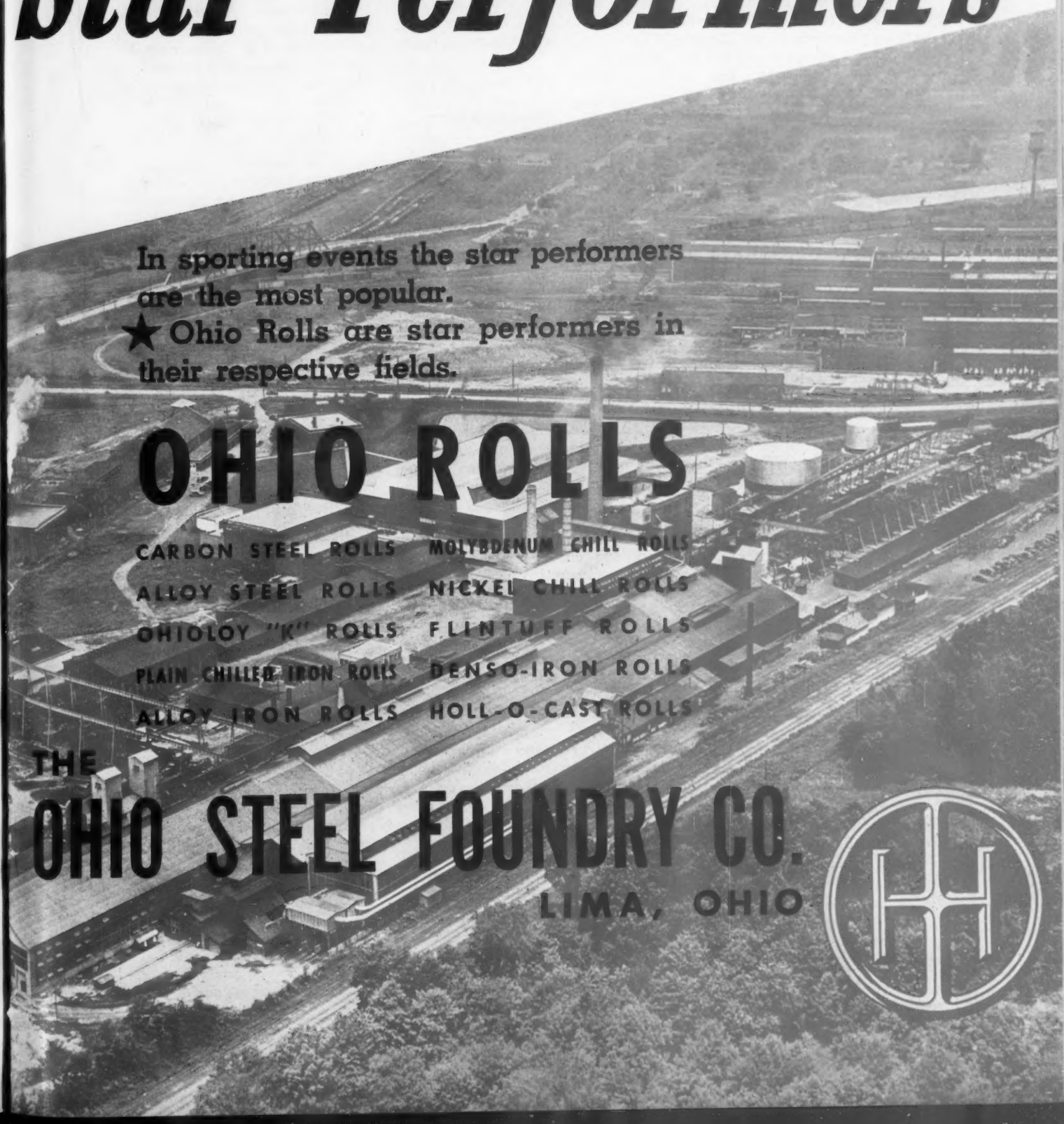

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Always An England

■ Sidelight on the international situation is the story of the German, Italian and Englishman who were all passengers on the Clipper. The plane is losing altitude and the captain of the ship says that all passengers must throw their baggage overboard. This is done. Still the plane continues to lose altitude. One of the passengers must leave the ship. The German volunteers. He shouts "Heil Hitler" and jumps. Later, the captain says another man will have to leave the plane. The Englishman volunteers. He says, "There'll always be an England," and throws the Italian out.

PD of OPACS of OEM

■ All of which may be somewhat far afield but we were reminded of it by the short and to-the-point letter from J. K. Galbraith, Assistant Administrator in charge of the Price Division of what was the Office of Price Administration and Civilian Supply of the Office of Emergency Management after he had read Guy Hubbard's recent article on reconditioned machine tools. Mr. Galbraith's title was, as a matter of fact, much longer than his letter. He wrote:

It contained some excellent suggestions.

An Expert's Expert

■ We've all heard of the ball players' ball player (Mr. Dickey of the Yanks) and the diplomats' diplomat (Mr. Welles of the State Dept.) and now it is becoming apparent that in Professor Macconochie STEEL has the ordnance experts' ordnance expert. Capt. P. A. Nelles, Jr. of the Boston District Ordnance office writes:

The series of articles by Prof. Macconochie are excellent. The manufacturing and theoretical problems of projectiles are discussed by a man who has evidently spent a great deal of time in the study of the subject. . . . Your magazine, STEEL, *is timely, educational and interesting.*

And Lt. Col. A. R. Baird of the Los Angeles Ordnance region writes:

We think the presentation of the details of shell production has been excellently done. Several of our officers and engineers have already ordered copies of the reprints from STEEL *for themselves, and copies in this office will be brought to the attention of local manufacturers.*

Any Others?

■ Whenever we see in print somewhere that something or other is the world's largest, world's fastest or world's greatest we shudder at the thought of the chickens that will probably come home to roost on the editor's desk in his next mail. When you start indulging in superlatives it never pays to be first. Two very nicely written letters commenting on the August 25 issue prove the point. Myles Morgan, Vice-President, Morgan Construction Co. writes, with reference to an item on the "largest capacity bearings" ever built:

This is neither to condemn or to condone . . . but to correct your records. Most people reading your statement that the bearings illustrated "have a mill separating force capacity of 8,300,000 lbs." would interpret it to mean each bearing had this capacity, while actually the capacity is divided between the two bearings on a single roll. You then go on to state that the bearings have 30% more capacity than any bearings ever built before and this again is an incorrect statement. There are seven 4-high roll stands in operation equipped with 56"-90 Morgoil bearings all of which have a continuous full load capacity of 5,250,000 lbs. each; or a separating force capacity of 10,500,000 lbs.

And from L. A. Umansky, Assistant Manager of General Electric's Industrial Engineering Department comes verification of the fact that "there is nothing new under the sun," in referring to the "new" floating motor drive described August 25:

The principle of the floating motor drive has been used for some 15 years on the runout tables of the Corrigan-McKinney Steel Co. (now Republic). In case of these merchant mills, the rotor of the table motor is pressed on the same shaft and is supported by the same bearings which carry the table rollers. The stator of the motor is supported by the bearings pressed on the same shaft, which arrangement insures the complete concentricity of the stator and of the rotor regardless of the warping of the shaft due to heat or to any other condition. The stator frame is restrained from rotating by two springs and a lug which are arranged in very much the same manner as you have described in your article.

The Shaner Habit

■ Those of you who have been reading Mr. Shaner's editorials in STEEL know, as we do, that his good, common, horse-sense thinking would go a long way in clearing up many of the problems of defense and production that seem to get so involved these days down in Washington. To those of you who haven't yet acquired the "Shaner habit" we strongly urge you to turn to page 54. One of his more recent converts is Horace J. Smith, President, Ward Heater Co., Los Angeles, Calif. who writes:

I've been reading your editorials in STEEL. *More power to you. You don't need more courage. Sometime you will get the results we all need. God help us if we don't.*

Vol. 109, No. 11, September 15, 1941, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the postoffice, Cleveland, O., under act of March 3, 1879. U. S. and Canada, 1 year $4; 2 years $6; foreign countries, 1 year $10; Current issues, 25c